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Evaluation of a Hydrosalinity Model of Irrigation Return Flow Water Quality in the Mesilla Valley, New Mexico

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Prepared for

Robert S Kerr Environmental Research Lab, Ada, OK

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Robert S. Kerr Environmental Research
Laboratory
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Evaluation of a Hydrosalinity Model of Irrigation Return Flow Water Quality in the Mesilla Valley, New Mexico

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A multi-cell lumped parameter model of irrigation-related water quality is applied to the Mesilla Valley, an irrigated valley encompassing roughly 40,500 hectares (100,000 acres) adjacent to the Rio Grande in southern New Mexico. The model, which was originally developed by the U.S. Bureau of Reclamation (USBR) for the Environmental Protection Agency (EPA), simulates diversions and pumping to meet irrigation needs, irrigation return flows, chemical transformations in the soil, and mixing in groundwater reservoirs.

Data on water quality at 35 surface and groundwater sites within the valley were collected on a monthly basis over two irrigation seasons. Analysis of water quality data from several observation wells in the shallow alluvial aquifer underlying the area demonstrates that there has not been a statistically significant change of the average salinity of the aquifer over the last decade.

The USBR-EPA model is evaluated in several computer simulations covering the ten-year period from 1967 through 1976. It is found that the model adequately simulates the observed seasonal pattern of salinity variation in the Rio Grande at the lower end of the valley near El Paso, Texas. Simulation results indicate that when irrigation efficiency is increased, there is a reduction in concentration of dissolved solids in the Rio Grande at El Paso, especially during the winter months.

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by

Lynn W. Gelhar
and
Stephen G. McLin

Department of Geoscience
New Mexico Institute of Mining and Technology
Socorro, New Mexico 87801
in cooperation with
New Mexico Water Resources Research Institute
Las Cruces, New Mexico 88003

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Project Officer

Arthur G. Hornsby
Source Management Branch
Robert S. Kerr Environmental Research Laboratory
Ada, Oklahoma 74820

ROBERT S. KERR ENVIRONMENTAL RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
ADA, OKLAHOMA 74820

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FOREWORD

The Environmental Protection Agency was established to coordinate administration of the major Federal programs designed to protect the quality of our environment.

An important part of the Agency's effort involves the search for information about environmental problems, management techniques and new technologies through which optimum use of the Nation's land and water resources can be assured and the threat pollution poses to the welfare of the American people can be minimized.

EPA's Office of Research and Development conducts this search through a nationwide network of research facilities.

As one of these facilities, the Robert S. Kerr Environmental Research Laboratory is responsible for the management of programs to: (a) investigate the nature, transport, fate and management of pollutants in groundwater; (b) develop and demonstrate methods for treating wastewaters with soil and other natural systems; (c) develop and demonstrate pollution control technologies for irrigation return flows; (d) develop and demonstrate pollution control technologies for animal production wastes; (e) develop and demonstrate technologies to prevent, control or abate pollution from the petroleum refining and petrochemical industries; and (f) develop and demonstrate technologies to manage pollution resulting from combinations of industrial wastewaters or industrial/municipal wastewaters.

This report contributes to the knowledge essential if the EPA is to meet the requirements of environmental laws that it establish and enforce pollution control standards which are reasonable, cost effective and provide adequate protection for the American public.

William C. Galegar

William C. Galegar
Director
Robert S. Kerr Environmental
Research Laboratory

ABSTRACT

A multi-cell lumped parameter model of irrigation-related water quality is applied to the Mesilla Valley, an irrigated valley encompassing roughly 40,500 hectares (100,000 acres) adjacent to the Rio Grande in southern New Mexico. The model, which was originally developed by the U. S. Bureau of Reclamation (USBR) for the Environmental Protection Agency (EPA), simulates diversions and pumping to meet irrigation needs, irrigation return flows, chemical transformations in the soil, and mixing in groundwater reservoirs.

Data on water quality at 35 surface and groundwater sites within the valley were collected on a monthly basis over two irrigation seasons. These data along with extensive data from previous and concurrent investigations provide a data base which is suitable for testing the USBR-EPA model. Analysis of water quality data from several observation wells in the shallow alluvial aquifer underlying the irrigation area demonstrates that there has not been a statistically significant change of the average salinity of the aquifer over the last decade. A special regression technique is developed to estimate the aquifer parameters required for the model.

The USBR-EPA model is evaluated in several computer simulations covering the ten-year period from 1976 through 1976. It is found that the model adequately simulates the observed seasonal pattern of salinity variation in the Rio Grande at the lower end of the valley near El Paso, Texas. Simulation results indicate that when irrigation efficiency is increased, there is a reduction in concentration of dissolved solids in the Rio Grande at El Paso, especially during the winter months.

This report was submitted in fulfillment of Grant No. S-803565 by the New Mexico Water Resources Research Institute (NMWRRI) under the partial sponsorship of the U. S. Environmental Protection Agency. This report covers a period from February 17, 1975 to August 16, 1978. The work was completed as of November 1, 1978.

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The following individuals contributed to various aspects of the work reported here:

Name	Position
Adel A. Bakr	Research Associate in Hydrology
Pongsarl Huyakorn	Assistant Professor of Hydrology
Richard L. Naff	Lecturer in Hydrology
Vijay P. Singh	Assistant Professor of Hydrology
Denise Bierley	Graduate Assistant
John B. Czarnecki	Graduate Assistant
Santiago Pinzon	Graduate Assistant
C. David Updegraff	Graduate Assistant
David L. Buckout	Undergraduate Assistant, Programmer
Lisa Cole	Undergraduate Assistant
Michael Shea	Undergraduate Assistant

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SECTION 1

INTRODUCTION

The overall objective of this study is to implement and test a computer-based mathematical model of irrigation-related water quality in the Mesilla Valley of south-central New Mexico. The model, which was developed by the U. S. Bureau of Reclamation (1977c) for the Environmental Protection Agency (EPA), can represent a general water and mass balance for a river basin or portion thereof (see Appendix B). The model includes components which simulate surface and groundwater reservoirs, diversions to meet irrigation needs and other uses, irrigation return flows, and chemical transformations in the soil. Several nodes can be used to simulate the conditions in different segments of a basin. The model is classified as a multicell lumped parameter model. Input data on water use, surface and groundwater quality, and streamflows and diversions are required for its operation.

The Mesilla Valley, an alluvial valley adjacent to the Rio Grande in southern New Mexico (Figure 1), extends approximately 96 kilometers (60 miles) from Seldon Canyon to El Paso Canyon and has a maximum width of about 8 kilometers (5 miles). The valley encompasses a gross area of about 40,500 hectares (100,000 acres). The area has had a relatively reliable supply of surface water for irrigation since the completion of the Elephant Butte Reservoir in 1916. Groundwater was developed extensively to supplement surface water during the severe drought in the 1950's and continues to be an important source. The major population centers include Las Cruces, New Mexico, and El Paso, Texas. The valley has a fairly level topography with a relatively flat alluvial floodplain ranging in width from about 100 meters to about 8 kilometers; it is bordered by steep bluffs of about 15 to 30 meters (50 to 100 feet) high, composed of loosely cemented sand, silt, clay, and gravel. Recent alluvium on the order of 30 meters (100 feet) thick forms the primary aquifer; this aquifer is underlain by basin fill deposits (Santa Fe Group) which also yield substantial amounts of water. The climate of the valley is predominantly semi-arid. It is characterized by clear and sunny days, large diurnal temperature ranges, low humidity and scant rainfall. The mean annual precipitation averages less than 25 centimeters (10 inches), with a recorded maximum of about 51 centimeters (20 inches) and minimum of about 8 centimeters (3 inches). The summer months are generally the wettest ones when tropical air masses from the Gulf of Mexico predominate over the area and cause thundershowers.

Several previous studies have dealt with the groundwater resources and irrigation in the Mesilla Valley. The work by King, et al. (1971) describes the hydrogeology of the valley and adjacent areas, and Richardson (1971) uses a digital computer model to simulate two-dimensional groundwater flow in the

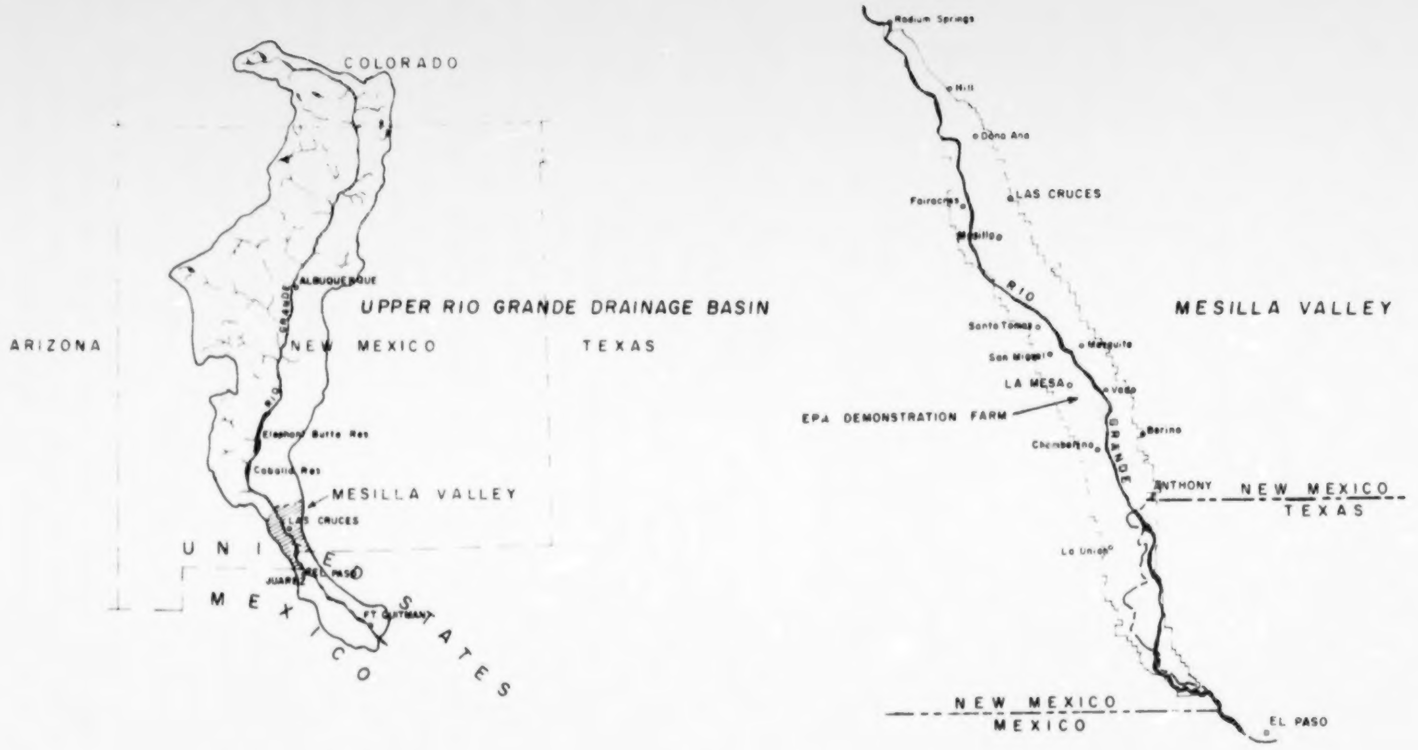


Figure 1. Location map of Mesilla Valley, New Mexico.

Mesilla Valley; both of these reports contain extensive reviews of earlier studies of the groundwater conditions in the valley. Information on the hydraulic properties of the aquifer has been developed by Conover (1954) and Leggat, et al. (1962). Studies by the U.S. Salinity Laboratory (Wilcox, 1968) investigate salt balance conditions in the Mesilla Valley and other areas of the upper Rio Grande Valley. Extensive records of surface and groundwater are maintained by the International Boundary and Water Commission and the U.S. Bureau of Reclamation. Recently, Hernandez (1976) has compiled much of the historical data on the quality of surface waters and reported the results for water quality monitoring at several sites in the valley. The U.S. Geological Survey at Las Cruces is currently conducting extensive field investigations which emphasize the groundwater conditions in the underlying basin fill (Santa Fe Group). Generally, there is comprehensive data on hydrologic conditions in the valley, but little or nothing has been done to incorporate this information into a model to predict the impact of irrigation on water quality.

Much emphasis in irrigation return-flow modeling has been on the flow and chemical characteristics in the near-surface unsaturated zone above the water table. Hornsby (1973) reviews modeling techniques which have been applied to predict the quality of irrigation return flows. Examples of recent computer-based models of moisture and salt transport in soils include Willardson and Hanks (1976); King and Hanks (1973); and Dutt, Shaffer, and Moore (1972). The latter represents chemical equilibrium of major ions and a kinetic approach to the nitrogen cycle in the soil. The inorganic soil chemistry portion of the USBR-EPA model, which is being used in the current study, is an outgrowth of that model.

When one considers the large volumes of water in groundwater storage, it is evident that aquifers underlying irrigated areas can play a central role in irrigation return-flow quality. At a recent workshop on irrigation return-flow modeling, Walker (1976) noted the need for improved information on groundwater behavior. Several recent modeling studies have emphasized the groundwater flow in salinity models (Maddaus and Aaronson, 1972; Lyons and Stewart, 1973; Konikow and Bredehoeft, 1974; and Hassan, et al., 1974); these models all represent two-dimensional horizontal flow with total dissolved solids taken as a conservative solute. In contrast, the Bureau of Reclamation (Shaffer, Ribbens, and Huntley, 1977) considers two-dimensional groundwater flow in a vertical plane and chemical equilibrium for major ions. Gupta, Tanji, and Luthin (1975) have developed a three-dimensional distributed parameter groundwater flow and quality model assuming a conservative solute. Lumped parameter groundwater flow and quality models have been used by Gelhar and Wilson (1974) and Mercado (1976); these models are similar to the structure implicit in the groundwater portion of the USBR-EPA model being used in the current study.

There have been several efforts to test the USBR-EPA model for field sites near Vernal, Utah; Cedar Bluff, Kansas; and in the Grand Valley in Colorado (U.S. Bureau of Reclamation, 1977a, 1977b). However, these case studies involved relatively small irrigated areas (around 4050 hectares or 10,000 acres) over simulation periods of only a few years, and the results seem to be rather mixed. In several cases, there are major differences between the observed and predicted seasonal pattern of water quality variation. It is not clear whether these differences are due to limitations of the input data or deficiencies of the model; the predictive capabilities of the USBR-EPA model have not been established.

The main objective of this study is to evaluate the predictive capabilities of the USBR-EPA model in a large scale complex irrigation system over a relatively long time frame. The Mesilla Valley, with its extensive base of existing data, is uniquely suited for this testing. The modeling results will also serve as input for economic studies on the effects of improved irrigation management in the valley.

SECTION 2

CONCLUSIONS

The U. S. Bureau of Reclamation Conjunctive Use and Water Quality Model, modified slightly to represent conditions in the Mesilla Valley, does adequately simulate the observed seasonal variation of salinity in the Rio Grande near El Paso, Texas, over the ten-year period from May, 1967 through the end of 1976.

The data collected during this study, along with that available from previous and concurrent studies, provides a suitable data base for evaluation of the USBR-EPA model in the Mesilla Valley. The data on groundwater quality are least adequate because of the high degree of spatial variability. The problems of adequate sampling of spatially variable subsurface water quality require attention in future research.

Analysis of data on dissolved solids from several shallow wells in the alluvial aquifer underlying the irrigated area in the Mesilla Valley shows that there has not been a statistically significant change of salinity over the last decade.

The USBR-EPA model, with soil chemistry effects included, predicts that an increase of irrigation efficiency during the last decade would have significantly decreased the salinity of the outflow from the valley in the Rio Grande at El Paso.

SECTION 3

MODELING DEVELOPMENTS

MODEL STRUCTURE

An extensive description of the U. S. Bureau of Reclamation Conjunctive Use and Water Quality Model (referred to herein as the USBR-EPA model) is given in the users manual (U. S. Bureau of Reclamation, 1977c); here emphasis is only on those features which pertain to the Mesilla Valley application. The USBR-EPA model represents an irrigated area by a series of small sub-units, each of which is called a node. The number of nodes depends on the physical features of the study area, the availability of data, and the number of points at which the model response is desired within the area. The model structure is based on a water balance for a given time interval which is computed and maintained for each node. The transfer of water between river and aquifer may be essential to maintain this balance. A soil column is included to simulate chemical exchange reactions as water percolates through the soil. The chemical exchange in the soil is represented by chemical equilibrium reactions for major ions which contribute to salinity; this segment of the model is based on the development by Dutt, Shaffer, and Moore (1972). The model allows the mixing of one water with another, and computes the chemical quality of the mixed waters in proportion to the volumes mixed. Thus, a chemical mass balance is simultaneously maintained. All these computations are performed for one node at a time and progress from the upstream to the downstream nodes.

A node includes simulation of several features as shown in Figure 2. These are: magnitude and quality of river flow; surface diversion to meet the irrigation demand; pumpage to meet irrigation demand; water transfer between river and aquifer; and irrigation return flows directly to the aquifer, through the soil to an aquifer, or to the river. The river flow at the start of a nodal operation is a known quantity, a portion of which is diverted to meet the irrigation demand. The irrigation return flow is then computed by subtracting the crop consumptive use from the irrigation demand. The chemical quality of mixed waters is computed at each point. At the end of a nodal operation, the balance between inflow to and outflow from the river is determined. If the river flow is in excess of that observed, the additional water is transferred to an aquifer; if the river flow is in deficit, water is withdrawn from the aquifer to maintain the balance. Hydraulic properties of the soil and aquifer are not considered directly in the model. These major features of the model are summarized in Table 1.

The input data needed to operate the model include irrigation demand, crop consumptive use, diversion, river-water quality, initial aquifer-water

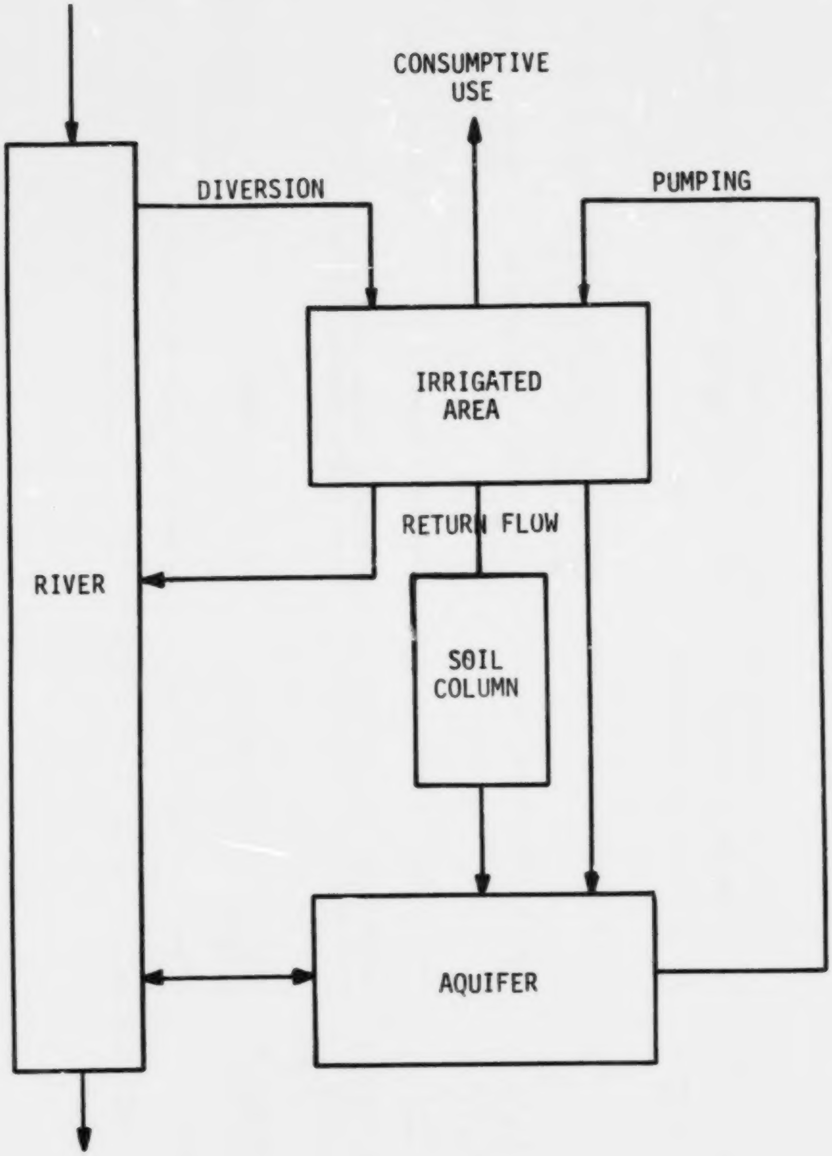


Figure 2. Schematic flow chart showing the features simulated in each node of the model.

TABLE 1. SUMMARY OF MAJOR MODEL FEATURES

MODEL FUNCTION	IMPLIED LIMITATION	DATA REQUIRED	COMMENTS
Multi-cell lumped parameter model will accept up to 20 cells (or nodes)	All variables are functions of time only	See following	Number of nodes depends on available data and physical features of area
Irrigation water balance to compute return flow	Deals with monthly average over nodal area	Diversion, irrigation demand, GW pumpage, irr. eff., consumptive use, % of return to aquifer and to river	Much of required data is hypothetical
Irrigation water chemistry represented by eight chemical constituents and TDS (Ca^{++}, Mg^{++}, Na^+, Cl^-, $SO_4^=$, HCO_3^-, $CO_3^=$, NO_3^-)	Deals with monthly average over nodal area	Surface diversion chemistry and GW chemistry	Chemistry based on volume proportion of waters mixed
Soil moisture movement thru as many as 10 soil column segments	Steady forced displacement each month	Soil moisture content	Optional feature of model
Soil chemistry includes reactions involving Ca^{++}, Mg^{++}, Na^+, $SO_4^=$, HCO_3^-, $CO_3^=$, and undissolved $CaSO_4$ and $MgSO_4$	Chemical equilibra approach where extended Debye-Huckel theory applies	Soil chemical analysis, cation exchange capacity, gypsum concentration	Neglects reactions involving Cl^- and NO_3^-
Aquifer balance transfers water to or from surface and to downstream nodal aquifer(s)	Transfer of flow between river and aquifer is forced to maintain water balance	Initial aquifer volume	River-aquifer transfer should depend on aquifer water level
Aquifer chemistry included in simulation	Uniform aquifer chemistry throughout an entire node	Average initial aquifer chemistry	Equivalent to a "well-mixed" reservoir assumption

storage and chemical quality, and soil moisture content and its chemical quality.

ADAPTATION OF MODEL TO MESILLA VALLEY

The Leasburg and Mesilla diversion dams, the two major water diversions in the Mesilla Valley, form natural nodes for the model. The quantity and chemical quality of flow in these diversions are observed. Therefore, two nodes were used to represent the Mesilla Valley as shown in Figure 3. Each node includes several operational features as depicted in Figure 4. The nodal configuration and its subsequent operation are best described by a sequence of operations that actually occur. Each operation is assigned a sequence number in the order that it takes place (Figure 4). In the assignment of sequence numbers, a positive number is assigned to inflow and a negative number to outflow or diversion. The configuration of operations in node 1 is essentially the same as in node 2, thus only node 1 is explained here.

At the upstream end of node 1, the flow in the Rio Grande is observed. The portion of this river flow diverted at Leasburg Dam is also observed. The river flow remaining after diversion is then computed; this quantity of flow is not available for irrigation use within node 1, and therefore is diverted from the node through sequence 1. The irrigation demand for crops in the area is computed independently, using the crop consumptive use and the overall irrigation efficiency. If the amount of surface water diversion is not sufficient to meet the demand, additional water is pumped from the aquifer. This feature was not available in the model input data setup for the Vernal study. Originally, the model would satisfy the demand either entirely by surface water or groundwater. Then the return flow, the difference between the demand and the consumptive use, is computed. A part of this return flow will go to the river and a part to the aquifer through the soil. Once the return flow mixes with river flow (after diversion), the chemical quality of river flow is updated; this river flow is identified as the predicted river flow. At the downstream end of the node the river flow, a combination of the waste flows from the Del Rio Drain and the Rio Grande at Mesilla Dam, is observed. A comparison is made between this observed flow and the predicted river flow to establish the required water transfer between river and aquifer. If the predicted flow is higher than the observed flow, the model forces a transfer of water from river to aquifer. If the predicted flow is lower than the observed flow, a transfer of water from aquifer to river is required. This exchange mechanism is essential to accomplish the hydrologic balance. When the exchange is made, the chemical quality of the flow is updated simultaneously. Finally, at the end of the nodal operation, the model yields the flow and its chemical quality.

The monthly input data used to operate the model include: observed river flow at the upstream end of the node and its chemistry, the amount of water diverted, crop consumptive use and irrigation efficiency, and observed river flow at the downstream end of the node; initial aquifer water storage, chemical quality, and soil chemistry are also necessary inputs. The soil chemistry input data are based on data from field plots at the New Mexico State University Plant Science Farm (Wierenga, 1977, Appendix Tables A-7 through A-14); the input data are averages of 42 analyses in each 10-centimeter (0.33 feet)

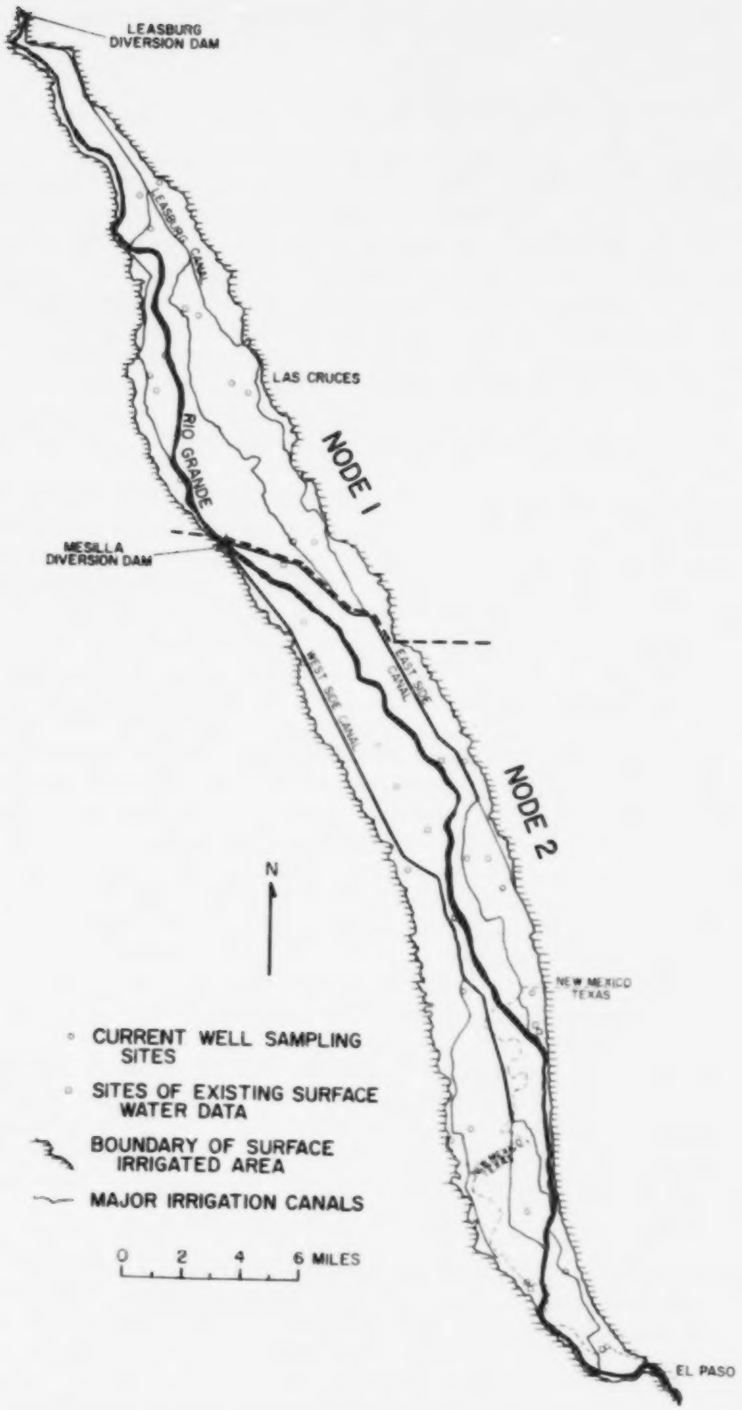
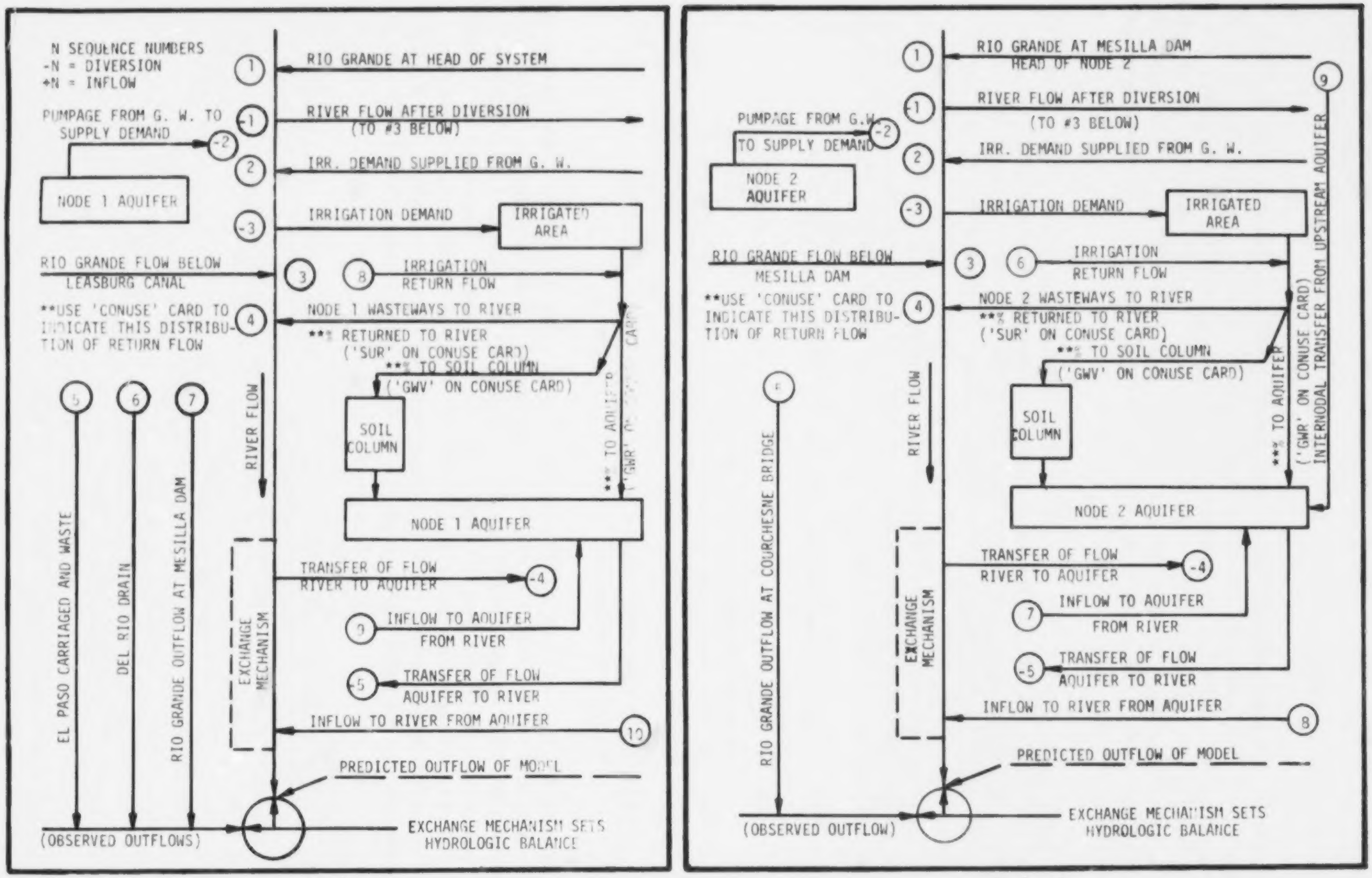


Figure 3. Nodal representation of Mesilla Valley.


N SEQUENCE NUMBERS
-N = DIVERSION
+N = INFLOW
PUMPAGE FROM G. W. TO SUPPLY DEMAND
-2
NODE 1 AQUIFER
1
RIO GRANDE AT HEAD OF SYSTEM
-1
RIVER FLOW AFTER DIVERSION (TO #3 BELOW)
2
IRR. DEMAND SUPPLIED FROM G. W.
-3
IRRIGATION DEMAND
IRRIGATED AREA
RIO GRANDE FLOW BELOW LEASBURG CANAL
3
8
IRRIGATION RETURN FLOW
**USE 'CONUSE' CARD TO INDICATE THIS DISTRIBUTION OF RETURN FLOW
4
NODE 1 WASTEWAYS TO RIVER
**% RETURNED TO RIVER ('SUR' ON CONUSE CARD)
**% TO SOIL COLUMN ('GWV' ON CONUSE CARD)
**% TO AQUIFER ('GWR' ON CONUSE CARD)
RIVER FLOW
SOIL COLUMN
NODE 1 AQUIFER
5
6
7
EL PASO CARRIAGED AND WASTE
DEL RIO DRAIN
RIO GRANDE OUTFLOW AT MESILLA DAM
EXCHANGE MECHANISM
TRANSFER OF FLOW RIVER TO AQUIFER
-4
9
INFLOW TO AQUIFER FROM RIVER
-5
TRANSFER OF FLOW AQUIFER TO RIVER
INFLOW TO RIVER FROM AQUIFER
10
PREDICTED OUTFLOW OF MODEL
(OBSERVED OUTFLOWS)
EXCHANGE MECHANISM SETS HYDROLOGIC BALANCE
1
RIO GRANDE AT MESILLA DAM HEAD OF NODE 2
9
-1
RIVER FLOW AFTER DIVERSION (TO #3 BELOW)
PUMPAGE FROM G.W. TO SUPPLY DEMAND
-2
NODE 2 AQUIFER
2
IRR. DEMAND SUPPLIED FROM G. W.
-3
IRRIGATION DEMAND
IRRIGATED AREA
RIO GRANDE FLOW BELOW MESILLA DAM
3
6
IRRIGATION RETURN FLOW
**USE 'CONUSE' CARD TO INDICATE THIS DISTRIBUTION OF RETURN FLOW
4
NODE 2 WASTEWAYS TO RIVER
**% RETURNED TO RIVER ('SUR' ON CONUSE CARD)
**% TO SOIL COLUMN ('GWV' ON CONUSE CARD)
**% TO AQUIFER ('GWR' ON CONUSE CARD)
INTERNODAL TRANSFER FROM UPSTREAM AQUIFER
F
RIO GRANDE OUTFLOW AT COURCHESNE BRIDGE
RIVER FLOW
SOIL COLUMN
NODE 2 AQUIFER
EXCHANGE MECHANISM
TRANSFER OF FLOW RIVER TO AQUIFER
-4
7
INFLOW TO AQUIFER FROM RIVER
-5
TRANSFER OF FLOW AQUIFER TO RIVER
INFLOW TO RIVER FROM AQUIFER
8
PREDICTED OUTFLOW OF MODEL
(OBSERVED OUTFLOW)
EXCHANGE MECHANISM SETS HYDROLOGIC BALANCE

Node 1 Node 2

Figure 4. Mesilla Valley system flow chart.

depth range for May, 1973. These averages are listed in Appendix A.

PRELIMINARY SIMULATIONS

Preliminary simulations were then developed for the Mesilla Valley with input data and operational procedures described above. The objectives of these simulations were to determine what model structure is suitable for the Mesilla Valley and to test the sensitivity of the model results to input data. The model was implemented with existing field data for the period of July, 1967 to June, 1968. A complete set of groundwater data was available at the beginning of this period.

To test the sensitivity of the model results to input data, the model response for both nodes in terms of total dissolved solids (TDS) in ppm from July, 1967 through June, 1968 was then examined by varying several input parameters. Initially the model was run using consumptive use of about 107 cm/yr (3.5 ft/yr) per unit area of cropland. The effects of several different input variables were then explored in simulations, the detailed results of which are given in previous annual reports (Lansford, et al., 1976, 1977). The features examined in the sensitivity analyses included the effects of

(1) a 25 percent reduction in the initial aquifer pore volume,
(2) a 50 percent reduction in the initial chemical concentration of aquifer waters,
(3) an average crop consumptive use of 61 cm/yr (2.0 ft/yr) with an irrigation efficiency of 50 percent, and
(4) a 50 percent increase in the initial chemical concentration in the soil.

Results of the effect of the above changes on the predicted model output are summarized in Table 2 and are discussed by McLin and Gelhar (1977). The results of the sensitivity analyses demonstrate that, in contrast to the minor role of soil chemistry and aquifer pore volume, the initial chemistry of aquifer waters and the combined effects of crop consumptive use and irrigation efficiency play an important role in the predicted TDS output. These results influenced the emphasis in data collection and the final simulations.

TABLE 2. SUMMARY OF RESULTS OF MODEL SENSITIVITY ANALYSIS

	Physical Feature	Effect
(1)	Twenty-five percent reduction in initial aquifer pore volume.	No appreciable difference from original predicted TDS output (i.e. identical to Figure 7)*.
(2)	Fifty percent in chemical concentration of aquifer waters.	Large systematic differences of several hundred ppm were noticed as compared to the original predicted TDS output (see Figure 8)*.
(3)	Consumptive use, 61 cm/yr; irrigation efficiency, 50 percent.	Produced systematic differences in predicted TDS output (see Figure 8)*. The transfer of water from the aquifer to the river remained practically unchanged (not shown in Figure 8)*.
(4)	Fifty percent in initial chemical concentration in the soil.	Produced only minor differences in TDS from that originally predicted for node 1. Node 2 differences are somewhat larger (see Figure 9)*.

*Figures referred to are in Lansford, et al., 1977.

SECTION 4

DATA AQUISITION AND ANALYSIS

EXISTING DATA BASE

Surface water data for the Mesilla Valley during the last 50 years are extensive; long-term records of flow since 1920 are available for most parts of the Mesilla Valley, except for the Rio Grande at Mesilla Dam. The latter information would be useful as a water balance check point for node 1, but the data are not required to operate the model. Extensive data on chemical quality are also available for the Rio Grande at the Leasburg Dam and at El Paso. Complete analyses of major ions are available for much of the period since 1920; however, some of the water quality data are in the form of electrical conductivity or TDS. The main drains (Selden, Picacho, Del Rio, La Mesa, East, and Montoya) have a long record of flow rates but a short record of water quality, usually in the form of electrical conductivity. Irrigation diversions (leasburg, East Side, and West Side canals) have excellent long-term flow-rate records but no chemical records. It is assumed that the Leasburg canal chemical quality is the same as that of the Rio Grande at the Leasburg Dam, and that the East Side and West Side canals have the same quality as the Rio Grande at the Mesilla Dam. A detailed summary of the existing surface water data availability is given in Table 2 of Lansford, et al., (1976). Agencies that have provided surface water data are the Bureau of Reclamation and the International Boundary and Water Commission, both at El Paso, Texas. Wilcox (1968) and Scofield (1938) were also sources of useful surface water data.

The groundwater data are less complete than the surface water data. The only long-term, monthly measurements of water levels are done by the Bureau of Reclamation in Las Cruces, New Mexico. Measurements of water levels in 40 shallow observation wells, penetrating into the upper portion of the flood plain alluvium, have been made since 1946. The chemical quality of water from these wells was apparently measured only once, during late May and early June of 1967 (Basler and Alary, 1968). Otherwise, the records of groundwater levels and quality are sporadic. Water-level and quality data were obtained from the U. S. Geological Survey branch offices in Las Cruces, New Mexico, and El Paso, Texas, the El Paso Water Utilities Public Service Board in El Paso, Texas, and from the following publications: Basler and Alary (1968); Conover (1954); Hudson and/or Bush (1964-1973); Leggat, Lowery, and Hood (1962); King, et al. (1969, 1971); and Richardson (1971).

The available surface and groundwater data for the Mesilla Valley for the period 1967 through 1976 are listed in Appendix A. Because of the lack of earlier quality data for groundwater, only this period could be simulated with the model. Most of the earlier data are available in the appendices of reports by Richardson (1971) and Hernandez (1976). Also included in Appendix A are flow data collected by the Bureau of Reclamation as a part of their$_3$ operational activities for the irrigation system in the Mesilla Valley.

DATA COLLECTION

Because of the importance indicated by the sensitivity analysis, the data collection program for this study emphasized groundwater quality. Monthly water samples were taken from 25 shallow two-inch diameter observation wells. These wells are maintained by the USBR or the USGS; their locations are shown in Figure 3. The wells were sampled using a one-pint bailer and were bailed at least 20 times, or until the well went dry. This was done to insure that aquifer water was obtained. Water levels were measured in each well before it was bailed. Electrical conductivity, temperature and pH were measured in the field. Monthly surface-water samples were obtained at ten locations as depicted in Figure 3. Electrical conductivity, temperature, pH, and alkalinity were measured on site. The water samples were analyzed by the Soil and Water Testing Laboratory at New Mexico State University; laboratory analyses included conductivity, pH, Mg^{++}, Na^{+}, K^{+}, Ca^{++}, Cl^{-}, HCO_3^{-}, $CO_3^{=}$, $SO_4^{=}$, and NO_3^{-}. A few check samples were also analyzed at the Water Chemical Laboratory of the Bureau of Mines and Mineral Resources at New Mexico Tech. Data collected during the project are also listed in Appendix A.

WATER BALANCE AND PARAMETER ESTIMATION

The specific yield of the aquifer must be determined in order to evaluate the volume of water initially stored in the aquifer. A calibration technique, or parameter estimation procedure, was developed for this purpose to determine the storage characteristic of the aquifer from observations of water level and drain flow. A simple water balance equation is used, which may be written in the form

$$S \frac{dh}{dt} = -q_d + q_r + q_\varepsilon \qquad (1)$$

where

h = average water level in the aquifer (m),

S = average specific yield of the aquifer,

q_r = rate of flow of water from river to aquifer per unit aquifer area (m/mo),

q_d = outflow or drain flow from the aquifer per unit aquifer area (m/mo),

q_ε = net recharge per unit aquifer area (m/mo), and

t = time (mo).

The outflow from the aquifer can be approximated by the linear term (Gelhar and Wilson, 1974)

$$q_d = a_d (h - h_d) \qquad (2)$$

in which a_d is an outflow constant (1/mo), h (m) is the average aquifer water level and h_d is the elevation of water in the drains (m); at the drain level, h_d represents a reference level at which the outflow is zero (Figure 5).

The model represented by Equation (1) with the outflow in Equation (2) is a lumped parameter model in the form of a linear reservoir. A sequential linear regression approach was used to estimate parameters for the shallow aquifer. In the following paragraphs the procedure is briefly described (for details see Updegraff and Gelhar, 1978).

First, Equation (2) is used to estimate a_d and h_d, given monthly values of h and q_d (see following section for computation of h). Then solving Equation (1) in finite difference form during the period of no irrigation (i.e., $q_\varepsilon = 0$) and applying the regression method to the resulting solution, the parameters S and q_r are estimated. Finally, the net recharge during the irrigation season is computed numerically integrating Equation (1) with all parameters known except q_ε. The term q_r, which was taken to be a constant during each year, represents leakage from the Rio Grande treated as a perched stream, plus other unmeasured sources of inflow to the aquifer (such as lateral flow from adjacent aquifers). This term, which averages about 1.8 cm/mo (0.06 ft/mo), reflects an additional net recharge to the aquifer over the year.

Monthly values of drain flow, q_d, are plotted in Figure 6 versus values of average groundwater levels in the Mesilla Valley for the period March,1946 through February,1951; the regression line fitted through the points is also shown. The slope of this best fit gives the outflow constant, a_d; its intercept with the abscissa determines h_d. Figure 7a is a comparison between observed groundwater levels in the valley and those simulated using the estimated parameters in Equation (1) for this period. The agreement between predicted and observed values is very good; the root mean square (rms) error is 4.0 centimeters (0.13 feet) and the maximum difference of about 9 centimeters (0.3 feet) occurs during the summer months. Total monthly drain flows, q_d, are depicted in Figure 7b versus the predicted values for the same period. Again, the agreement between predicted and observed values is exceptionally good (rms error = 1.2 cm/mo (0.07 ft/mo)). Figure 7c illustrates a comparison of the estimated recharge term, q_ε, with the observed irrigation diversion for the valley. The temporal variation of recharge is very similar to that of the diversion but the amplitude is reduced as a result of water consumption by vegetation.

Estimated average specific yield of the shallow alluvial aquifer in the valley is 0.21. This value compares with the study by Richardson (1971) which showed that a distributed groundwater model reasonably simulated the historical water level data when the storativity of the aquifer was assumed to be 0.20. Conover (1954) estimated that the specific yield of the alluvial

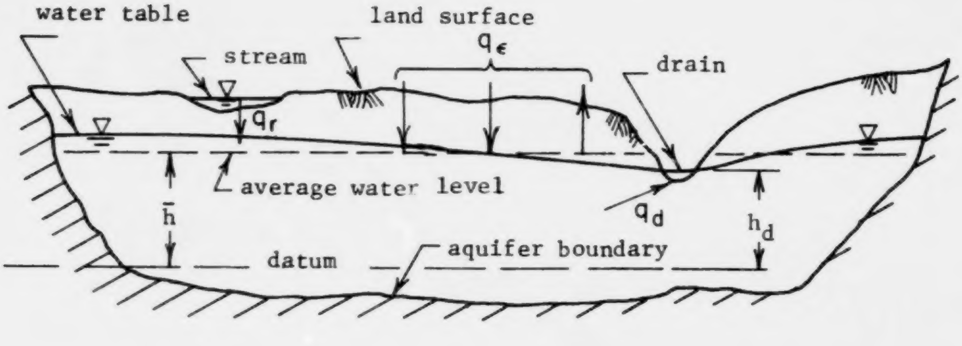


Figure 5. Schematic vertical section of an aquifer with a perched stream.

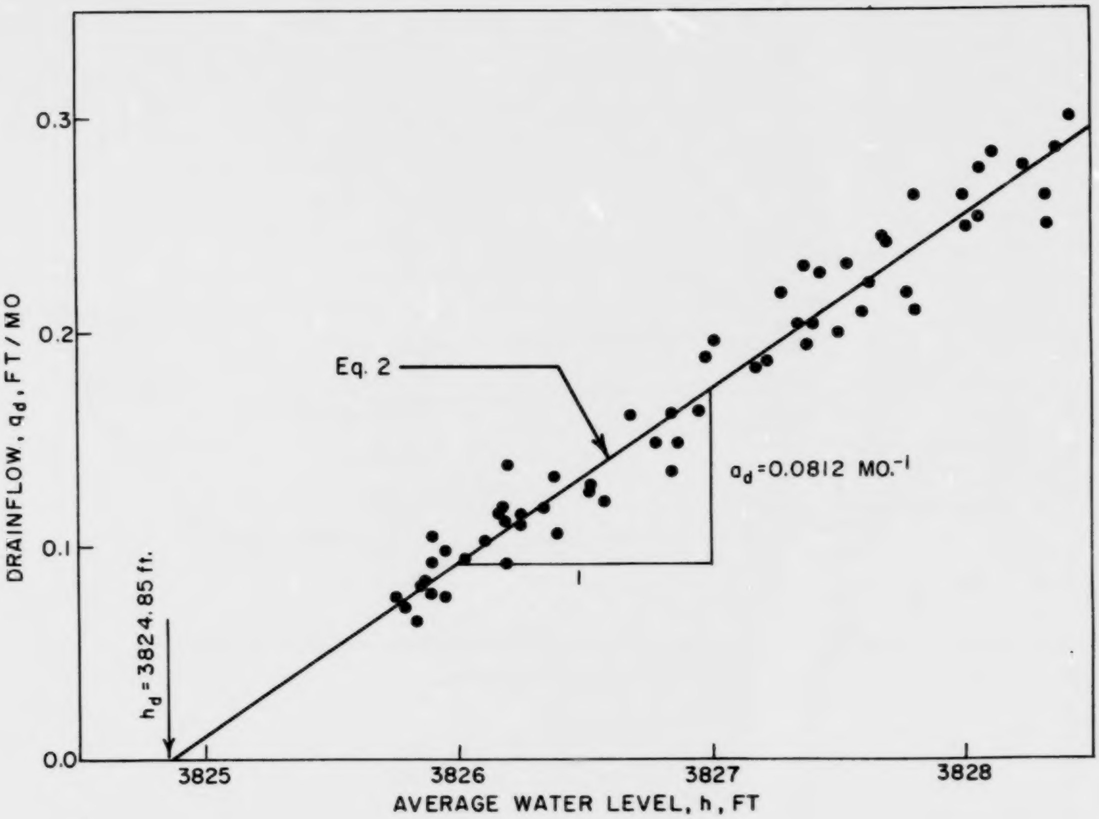


Figure 6. Monthly drain flow (q_d) versus average aquifer level (h).

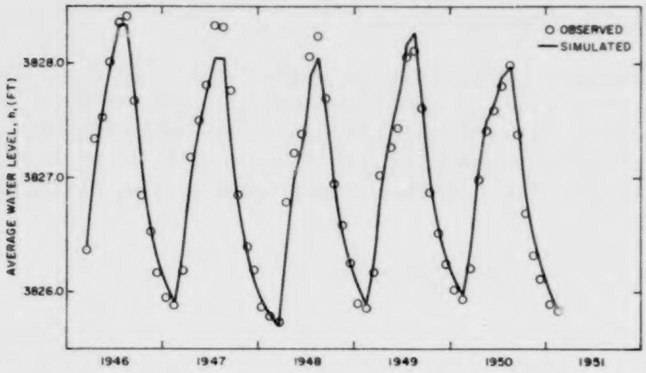


Figure 7a. Observed and predicted groundwater levels.

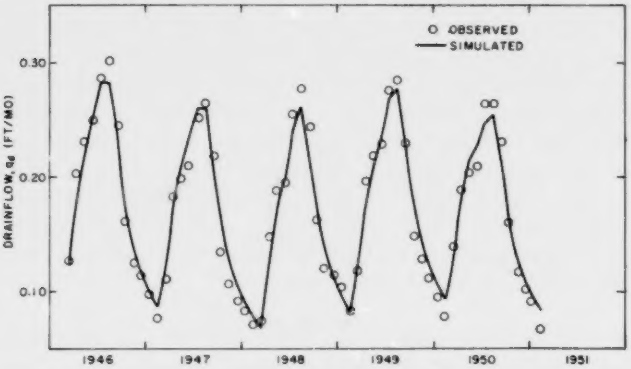


Figure 7b. Observed and predicted drain flows.

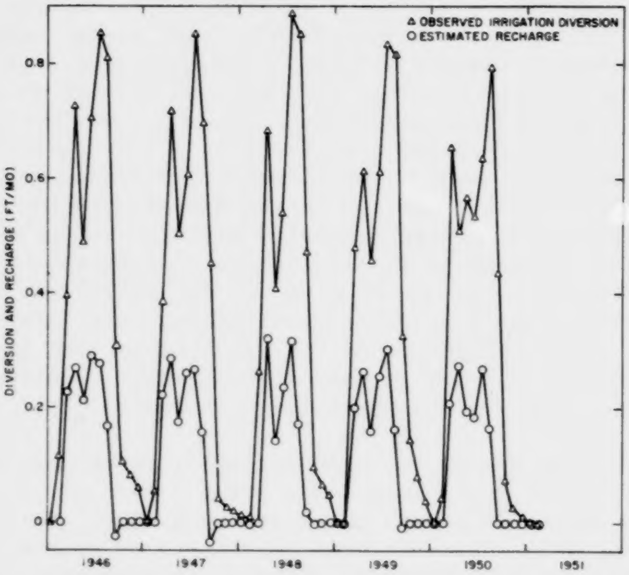


Figure 7c. Estimated recharge compared with observed irrigation diversion.

aquifer would probably average about 0.25.

The above parameter estimation procedure has also been done for the period 1946 through 1976 using a nonlinear outflow relationship which is more accurate than Equation (2) for small drain flows (see Pinson, 1978, for details). In this case, the specific yield was found to be 0.22; this value was adopted to estimate the aquifer volume used in the final simulations with the USBR-EPA model.

ANALYSIS OF CHEMICAL AND WATER-LEVEL DATA

The Thiessen polygon method (Linsley, Kohler, and Paulhus, 1975, p. 82-84) was used to obtain areal average values of observed quantities of TDS and water levels over each of the nodes of the model. This method is convenient because it yields fixed weighting factors for a given configuration of wells. The initial storage in the alluvial aquifer was determined by applying the Thiessen weighting factors to the observed depths to water in the observation wells to produce an average depth to water in each node. The bottom of the alluvial aquifer was taken to be an average of 24 meters (80 feet) below the land surface as indicated by King, et al. (1971). The horizontal extent of the alluvial aquifer was taken to be the gross area encompassed by the boundary of the surface-irrigated area as measured from the Elephant Butte Irrigation District Map, Mesilla Valley unit, provided by the U. S. Bureau of Reclamation; the areas of nodes 1 and 2 are 16,498 and 27,376 hectares (40,767 and 67,645 acres), respectively. As discussed previously, the specific yield of the aquifer was taken to be 0.22.

Figure 8 shows the water-table contour map which was constructed from the water level data for the 40 USBR observation wells for May, 1967, the initial condition for the simulations. This map shows a general downvalley gradient; the water-table configuration appears to be very smooth and regular. A water-table map was also constructed for May, 1976; although there were some minor differences in water level at individual wells, the general pattern of the water-table contours was not significantly different from that in 1967. If more observation wells were available, the water-table configuration might be more complex. For example, using data for May, 1965 through August, 1968, King, et al. (1971) have prepared a water-table map which includes the same area. Their map shows the same general downvalley gradient but the water-table configuration is more contorted in the area around Las Cruces. This complexity seems to be associated primarily with the municipal well field east of Las Cruces. This field is outside the area of the alluvial aquifer. Some of the variations in the map by King, et al. (1971) may also reflect seasonal or temporal changes in water level through the three-year period which was used by them. In any case, the water-table configuration is quite smooth so that the Thiessen method should yield accurate estimates (say within a few percent) of the average water level in the valley.

As shown in Figure 9a, b, the spatial variation of groundwater quality (TDS for May, 1967, from Basler and Alary [1968]) is much more complex than that of the water table. Although there are large local variations of TDS which probably depend on local drainage conditions or proximity of irrigation ditches, there seems to be an overall trend of increasing salinity down the

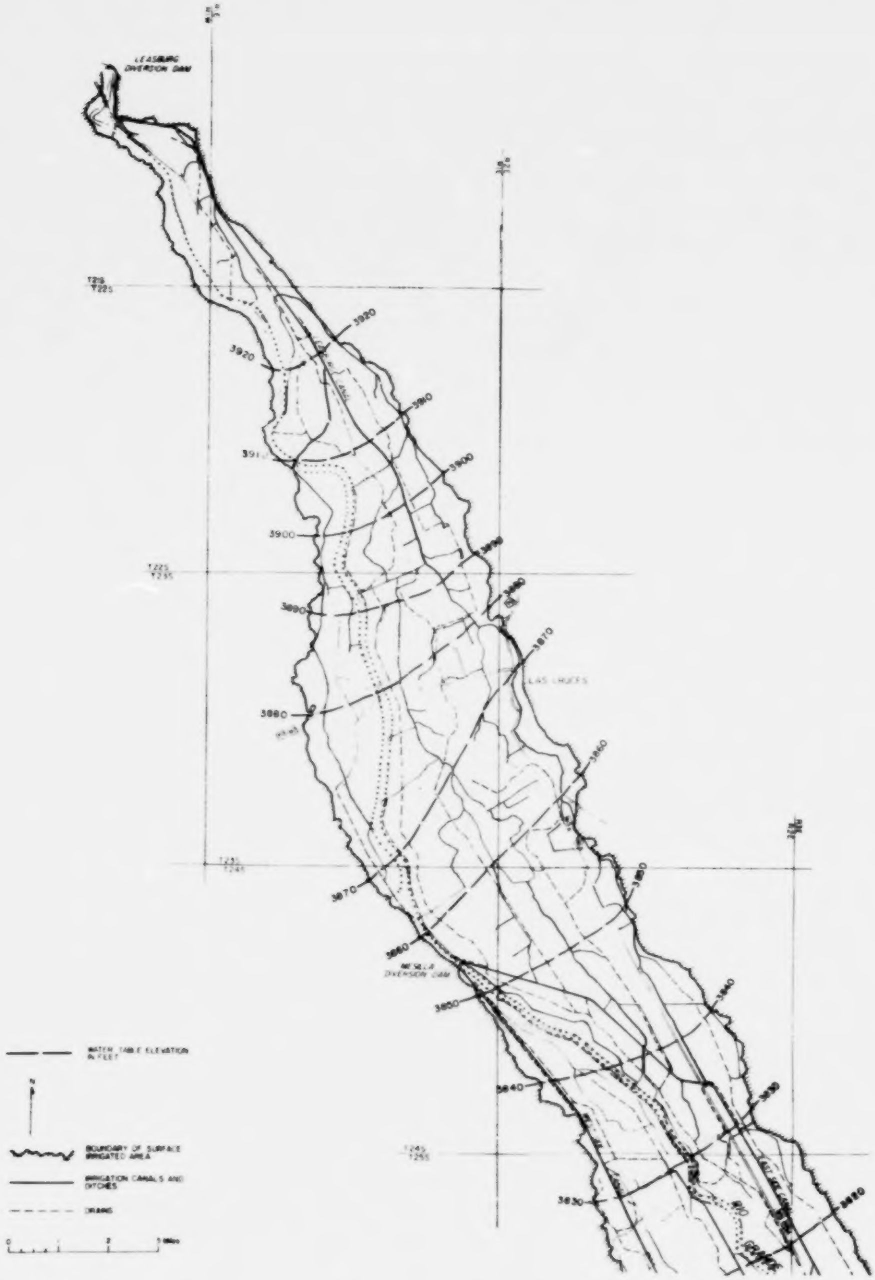


Figure 8a. Water-table map, May-June,1967, northern Mesilla Valley.

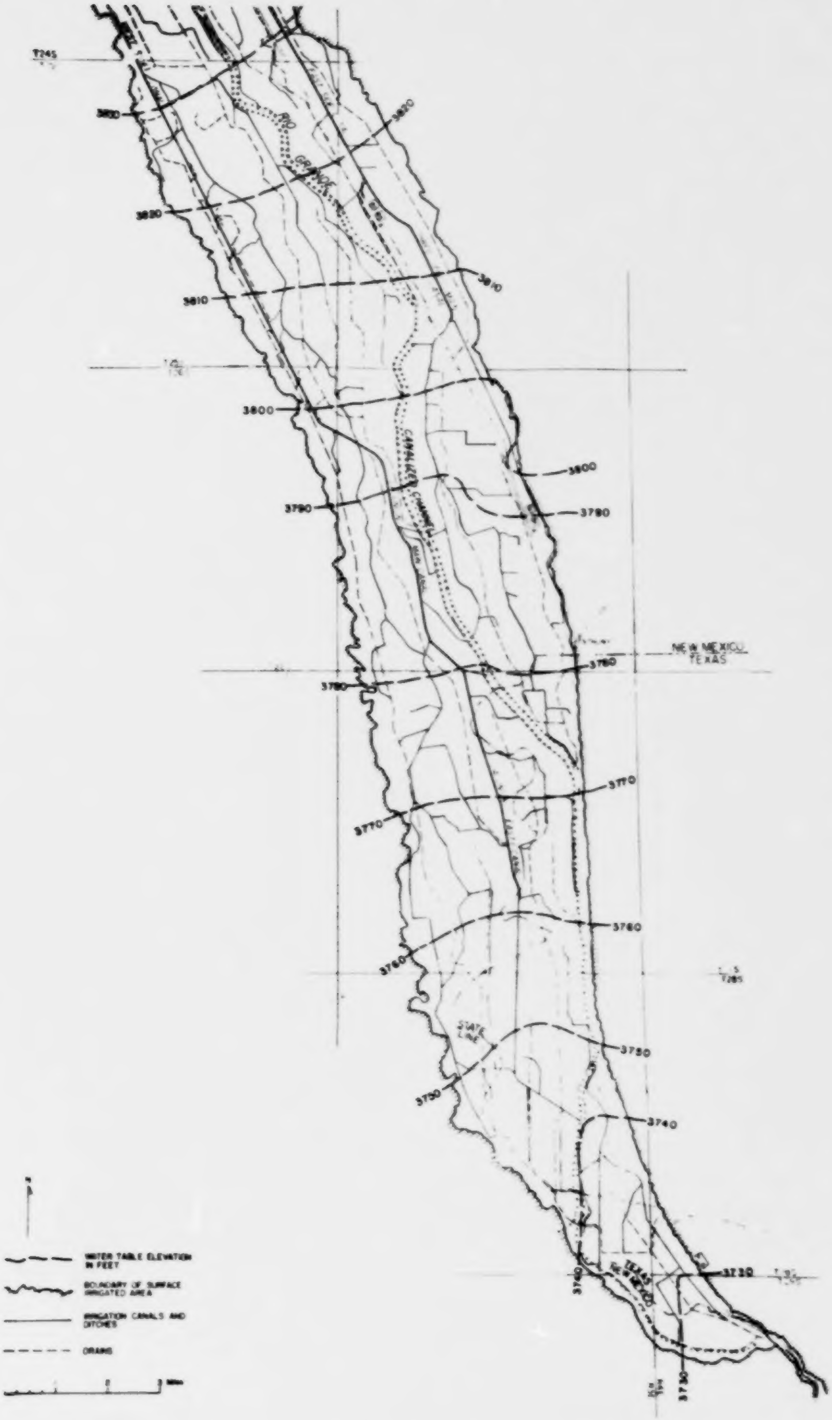


Figure 8b. Water-table map, May-June 1967, southern Mesilla Valley

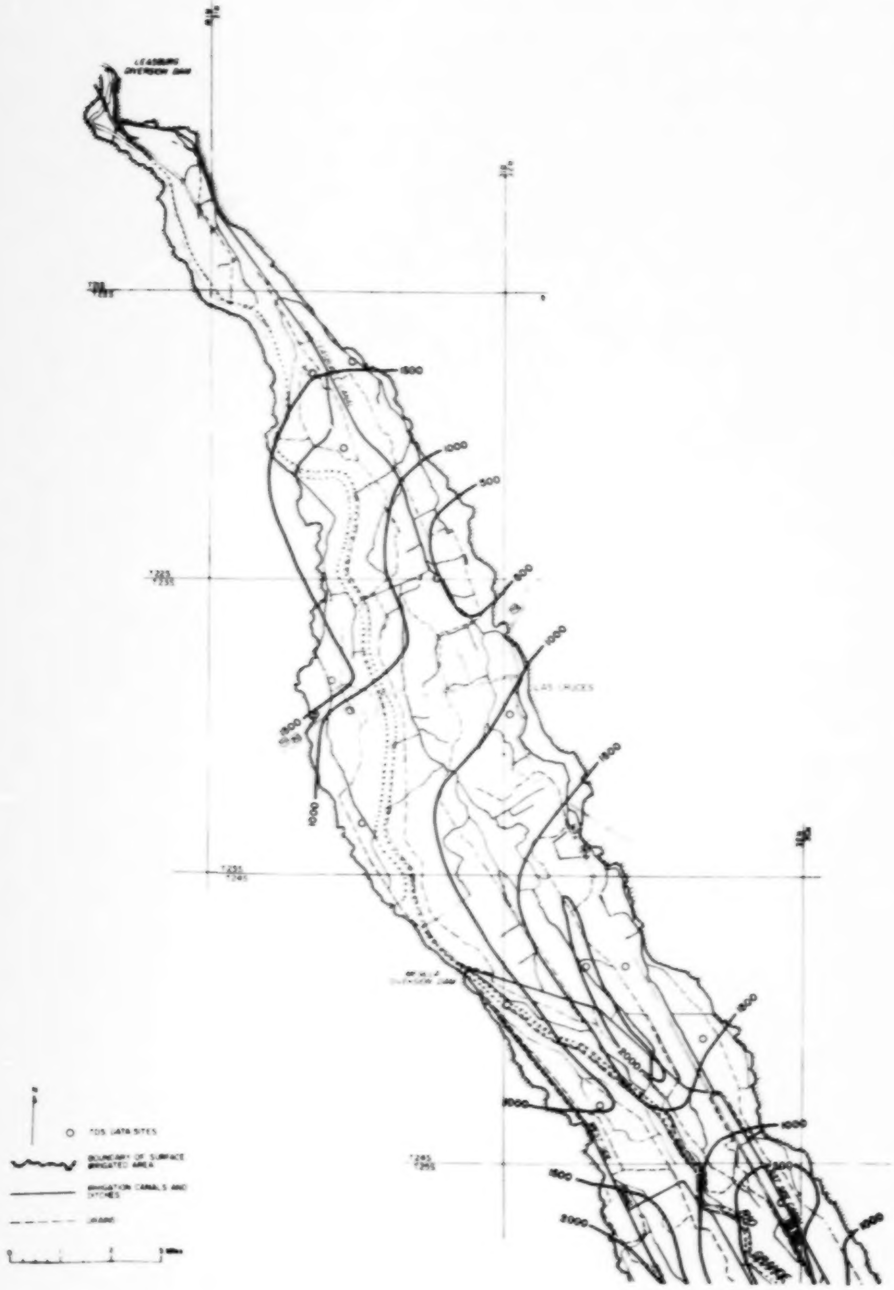


Figure 9a. TDS contour map in ppm, May-June,1967, northern Mesilla Valley.

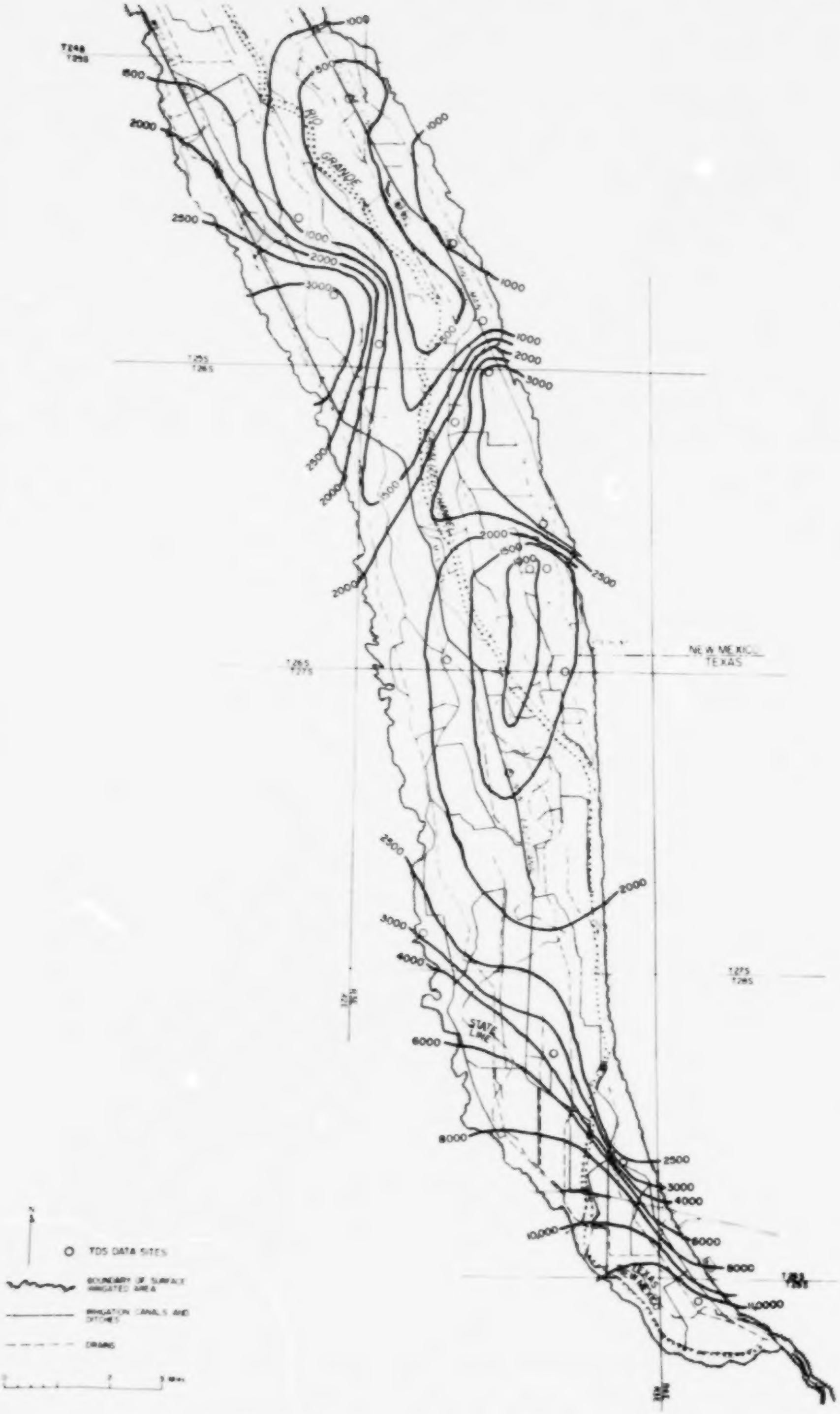


Figure 9b. TDS contour map in ppm, May-June 1967, southern Mesilla Valley.

valley, as suggested by Conover (1954) and Leggat, Lowery, and Hood (1962). Figure 10a, b shows the corresponding contour map of TDS for May, 1976, based on data collected during this study. There seem to be major differences in the water quality patterns between Figures 9a, b and 10a, b although some of this difference may reflect the fact that fewer observation points were available for obtaining aquifer chemistry data in 1976. There remains, however, a trend of increasing salinity down the valley.

Because of the complex spatial variation of aquifer water quality, another method was considered for estimating the average concentration by integration of the area surrounding given concentration isopleths on maps such as Figures 9a, b and 10a, b. This method was used to estimate average TDS from Figure 9a, b; an estimate for HCO_3^- was also made from the data of Basler and Alary (1968). The average TDS obtained from the integration method was 16 percent higher than the value found using the Thiessen method, but the difference between the two methods was only 1 percent for HCO_3^-. Because the construction of concentration isopleth maps is quite subjective, especially with the small number of data points available, the Thiessen method which yields a unique set of weighting factors for a given configuration of wells was chosen.

The estimation of the average water quality of the aquifer is further complicated by the fact that there are major changes of concentration in any vertical direction selected in the valley. The water in the underlying Santa Fe Group, which may be several hundred meters below the land surface, is generally of good quality; the TDS may be as low as 300 to 400 ppm. In contrast the shallow wells which were sampled throughout this study, and earlier by Basler and Alary (1968), probably represent only the upper part of the alluvial aquifer; average concentrations in these wells are about 1900 ppm of TDS. Very little detailed information is currently available on the vertical distribution of salinity, but some preliminary results of an on-going study by the U. S. Geological Survey (C. A. Wilson, written communication, 1977) indicate that the transition zone occurs in the range of 15 to 45 meters (50 to 150 feet) below land surface. The transition does not necessarily coincide with the geologic unconformity at the base of the recent flood-plain alluvium. The concentration was assumed constant with depth to the assumed average base of the alluvial aquifer at 24 meters (80 feet). (USBR well no. 34 was not used in the calculations of average aquifer water quality because we felt the extremely high TDS (greater than 11,000 ppm) was a local anomaly which was not representative of the quality over the depth of the aquifer).

To further illustrate the variability of groundwater quality, Figure 11 shows monthly values of TDS from 15 of the observation wells over a two-year period from November, 1975 to November, 1977. It can be seen that the temporal variation at any one individual well is much less than the variation between wells at a given time. There are some temporal changes which seem common to most wells (e.g., the increase in November, 1976) but there does not seem to be any clear seasonal pattern in the data.

The importance of the large variability of groundwater quality becomes more evident if a statistical interpretation of temporal changes in the water quality is made. Table 3(a) summarizes data for May of 1967, 1976, and 1977;

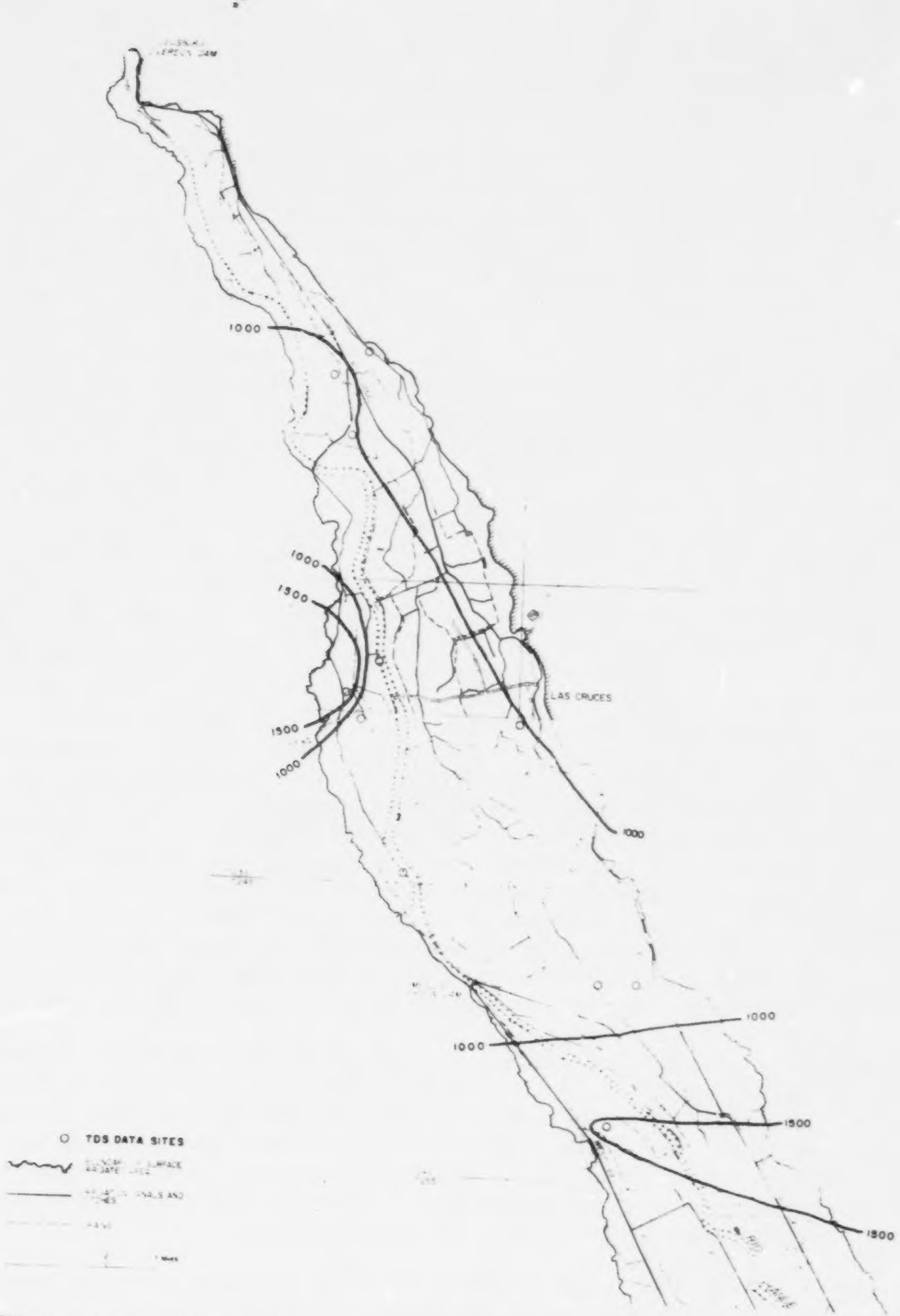


Figure 10a. TDS contour map, May,1976, northern Mesilla Valley.

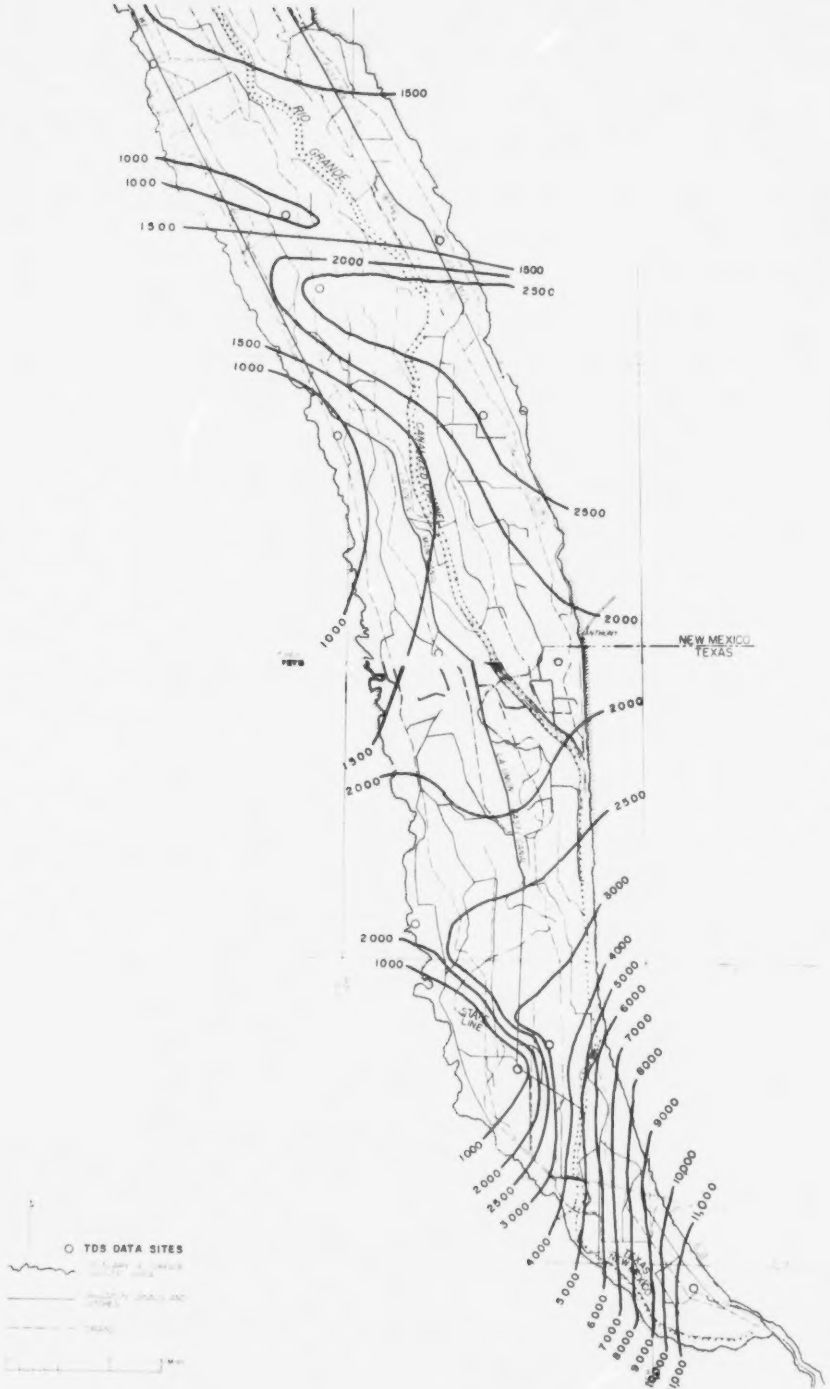


Figure 10b. TDS contour map, May 1976, southern Mesilla Valley.

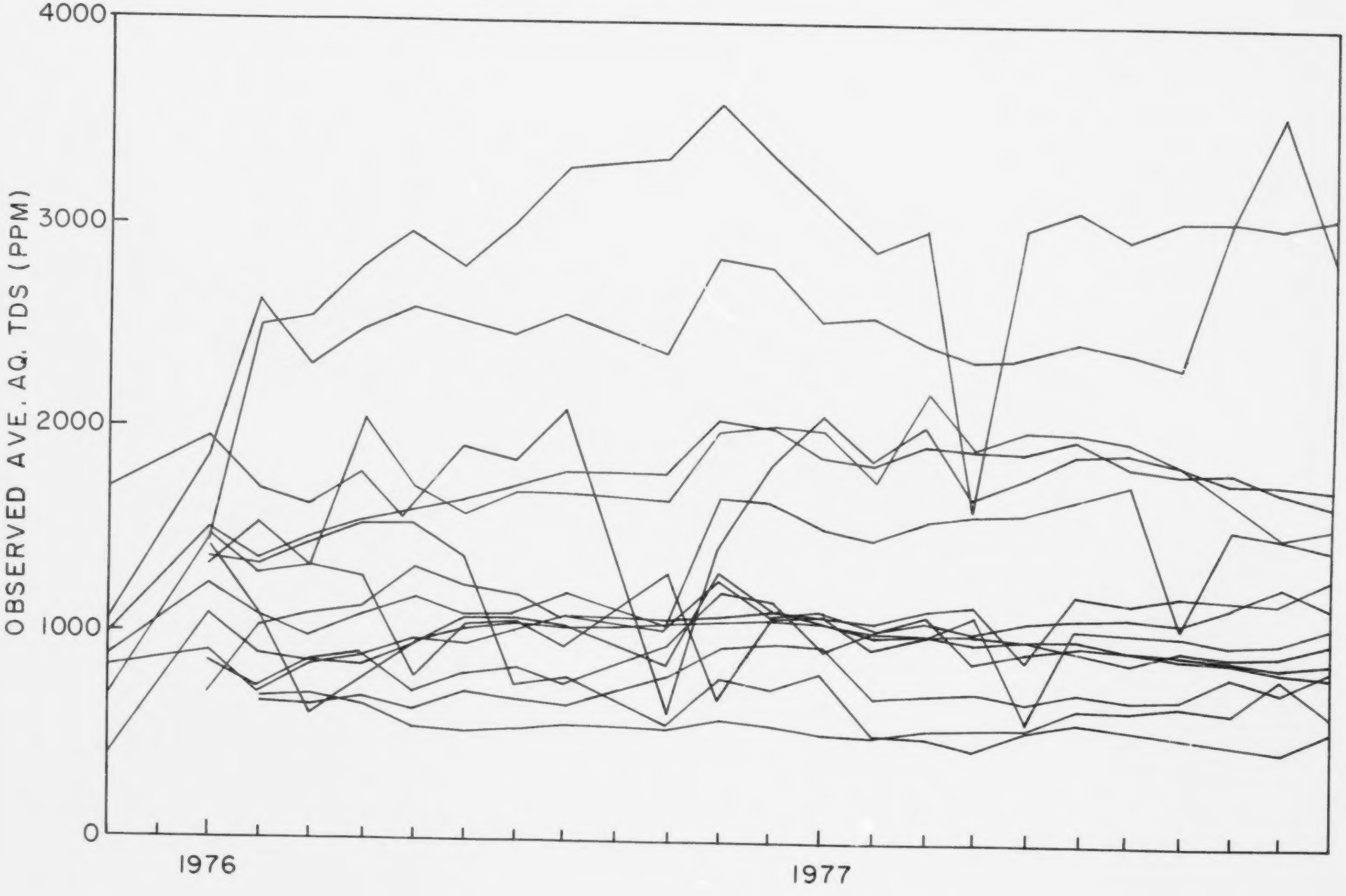


Figure 11. Monthly TDS values from 15 observation wells for November,1975 to November,1977.

the Thiessen weighted and the arithmetic means are shown along with the standard deviation of the arithmetic values. There are similar systematic changes of the Thiessen weighted and arithmetic means over these years, but one may then ask the question: Has there been a significant change in the quality of the shallow groundwater in the Mesilla Valley over the last decade? If it is assumed that the observations are spatially independent and that the observations at any two times are independent, a standard test of hypothesis based on the student t-distribution leads to the conclusion that the differences of the arithmetic means is not significant at the 95 percent level. This is a robust result; the standard deviation would have to be at least one order of magnitude smaller for the difference of means to be significant.

However, inspection of data in Figure 11 indicates that the TDS concentrations are correlated at least over the two-year period (November, 1975 to November, 1977), and the concentration remains high throughout the period for some wells and low for others. To determine whether this correlation has persisted over the past decade, it is necessary to consider only wells for which data is available for both of the periods being compared (e.g., May, 1967 compared to May 1976; May, 1967 compared to May, 1977), and consider the statistical dependence of the observations. Table 3(b) summarizes the results of such an analysis; the strong dependence of the samples at given wells, even over a ten-year period, is indicated by the high correlation coefficients. None of the changes in the mean TDS are significant at the 95 percent level; however, the decrease in TDS from 1967 to 1976 would be significant at the 80 percent level. The analysis which assumes independence (Table 3[a]) can be very misleading as it implies that the decrease in TDS from 1967 to 1976 is far from being significant. Thus, if one is attempting to monitor temporal change of groundwater quality in a spatially variable system, it is important to use the same network of wells throughout the observations. The results in Table 3(b) also imply that the similar spatial pattern of groundwater quality distribution has persisted in the Mesilla Valley over the last decade. In this case, statistical analysis is required to identify this persistent spatial pattern; subjective comparison of concentration isopleth maps (Figures 9 and 10) does not show this feature.

Statistical comparison of the results of the chemical analyses from the laboratories at New Mexico State University (NMSU) and at the Bureau of Mines and Mineral Resources at New Mexico Tech (NMT) were also made; typical results are shown in Figure 12. The 95 percent confidence intervals on the slope and intercept of the linear regression parameter indicate that these values are not significantly different from one and zero, respectively; hence, in conclusion the analyses from the two laboratories were consistent. The data from the NMSU laboratory were used in subsequent analysis.

ANALYSIS OF AQUIFER AND WELL DATA

Some observations which pertain to the vertical extent of the alluvial aquifer used in the USBR-EPA model are considered. It is generally accepted that the depth of the lat quaternary flood-plain and channel deposits of the Rio Grande averages around 24 meters (80 feet) in the Mesilla Valley (see King, et al., 1971, and several references therein). Drilling and well

TABLE 3. STATISTICAL ANALYSIS OF TEMPORAL VARIABILITY OF WATER QUALITY

(a) STATISTICAL COMPARISON OF TOTAL DISSOLVED SOLIDS (PPM)* CHANGES ASSUMING INDEPENDENT SAMPLES

Date	No. of Wells	Theisson Weighted Mean	Arithmetic Mean	Sample Standard Deviation
May 1967	32	1846	1930	1976
May 1976	24	1777	1857	2310
May 1977	22	1887	2071	2283

t-Statistics Test

1967(x) to 1976(y): Estimated standard deviation s=2124, m=32, n=24, degrees of freedom m + n-2=54, 95% t=2.01, $t=\sqrt{mn/(m+n)}(\bar{x}-\bar{y})/s=0.126<2.01$. Difference is not significant at 95% level.

1967(x) to 1977(y): Estimated standard deviation s=2105, m=32, n=22, degrees of freedom m + n-2=52, 95% t=2.01, $t=0.242<2.01$. Difference is not significant at 95% level.

(b) STATISTICAL COMPARISON OF TOTAL DISSOLVED SOLIDS (PPM)* CONSIDERING DEPENDENT PAIRED SAMPLES FOR MAY

Sample Year		No. of Wells	Arithmetic Means			Estimated Standard Deviations					
x	y	n	$\bar{x}$	$\bar{y}$	$\bar{z}$	s_x	s_y	s_z	r_{xy}	t	95%t
1976	1967	17	2096	2282	-186	2655	2562	467	0.9846	1.65	2.12
1977	1967	15	2258	2345	-87	2642	2730	341	0.9925	0.99	2.15
1977	1976	21	2031	2020	10.4	2331	2431	368	0.9889	0.13	2.09

Difference, $z=x-y$; correlation coefficient, $r_{xy}=[\Sigma xy-(\Sigma x)(\Sigma y)/n]/[s_x s_y (n-1)]$; z variance, $s_z^2=s_x^2+s_y^2-2r_{xy}s_x s_y$; t statistic, $t=|\bar{x}-\bar{y}|\sqrt{n}/s_z$.

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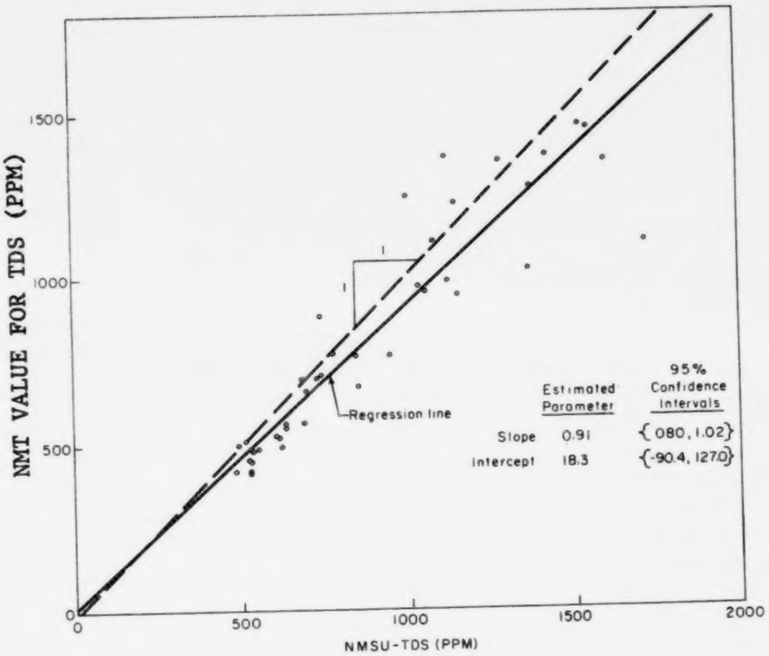
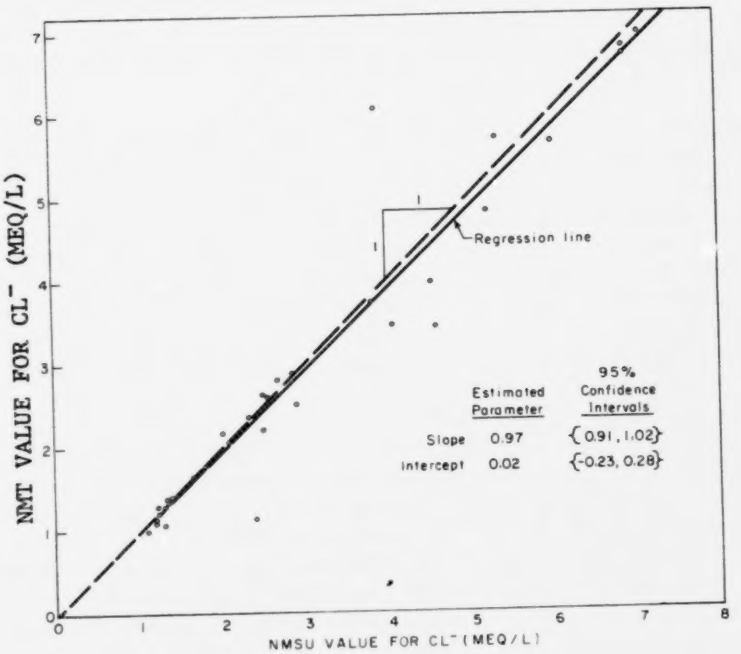
[*] Based on the sum of the ppm of the major ions present (Ca^{++}, Na^{+}, Mg^{++}, K^{+}, HCO_3^{-}, $CO_2^{=}$, $SO_4^{=}$, and Cl^{-}).



TDS comparison



Chloride comparison

Figure 12. Comparison of analyses from New Mexico State University and New Mexico Tech.

logging data which is being collected by the U. S. Geological Survey as part of an on-going study of the groundwater resources of the area also supports this value for the depth of the recent alluvium (C. A. Wilson, written communication, 1977). Previous studies also indicate that hydraulic conductivity of the underlying Santa Fe Group is substantially lower than that of the alluvium; aquifer test data reported by Leggat, Lowery, and Hood (1962) imply that the hydraulic conductivity of the alluvium is ten times that of the Santa Fe aquifer, and Conover (1954) indicates threefold differences in the hydraulic conductivity between the two aquifers.

This contrast in hydraulic conductivity is also implied from the analysis of specific capacity data for many wells in the Mesilla Valley. Using data on water levels in pumping wells as collected by the U. S. Geological Survey (C. A. Wilson, written communication, 1977) and estimates of the static water levels obtained by interpolation between wells in the United States Bureau of Reclamation network, calculations were made of the specific capacity of 76 wells ranging in depth from 19 to 230 meters (62 to 750 feet). These are mainly irrigation wells which are usually screened or perforated over the entire depth. However, some of the deeper wells are known to be screened only in the Santa Fe aquifer. The data are summarized in Figure 13, which shows that the logarithm of specific capacity of these wells tends to decrease with increasing well depth. Although there is a substantial amount of scatter, the negative slope of the regression line is significant at the 95 percent level. Because the specific capacity is proportional to the transmissivity, this result further demonstrates a significant reduction of hydraulic conductivity in the Santa Fe aquifer. Figure 14 shows a normal probability plot of these data in terms of the logarithms of depth and of specific capacity. The roughly linear relationships imply that both variables follow approximatley a lognormal distribution.

From Figure 14 it is evident that many irrigation wells will produce from the alluvium and the Santa Fe aquifer; the median well depth is around 46 meters (150 feet). Also, over the years, the average depth of irrigation wells seems to have increased because new wells are drilled deeper to obtain the better quality water. This fact further complicates the definition of the lower boundary and the initial chemical quality of the aquifer used in the model; the depth of 24 meters (80 feet) has been arbitrarily selected to represent the alluvium since the primary interest is in the aquifer water chemistry resulting from the influence of irrigation (see previous discussion).

The areal extent of the alluvial aquifer and possible lateral inflows to it are also difficult to define precisely. The water-table map of King, et al. (1971) indicates that lateral inflow could be significant from the area east of the valley; considering the transmissivity of the Santa Fe aquifer and the indicated gradient, the amount of lateral inflow may be on the order of 1.23×10^7 m^3/yr (10,000 ac-ft/yr). This inflow may be partly compensated for by the outflow from the alluvium which is induced by pumping in the Las Cruces well field and other municipal supplies; such outflows are probably similar in order of magnitude to the lateral inflow. Phreatophyte transpiration may also account for a loss of water of about his same magnitude, but this will be balanced to some extent by contributions from the precipitation over noncropped areas and intermittent surface runoff from adjacent areas. However,

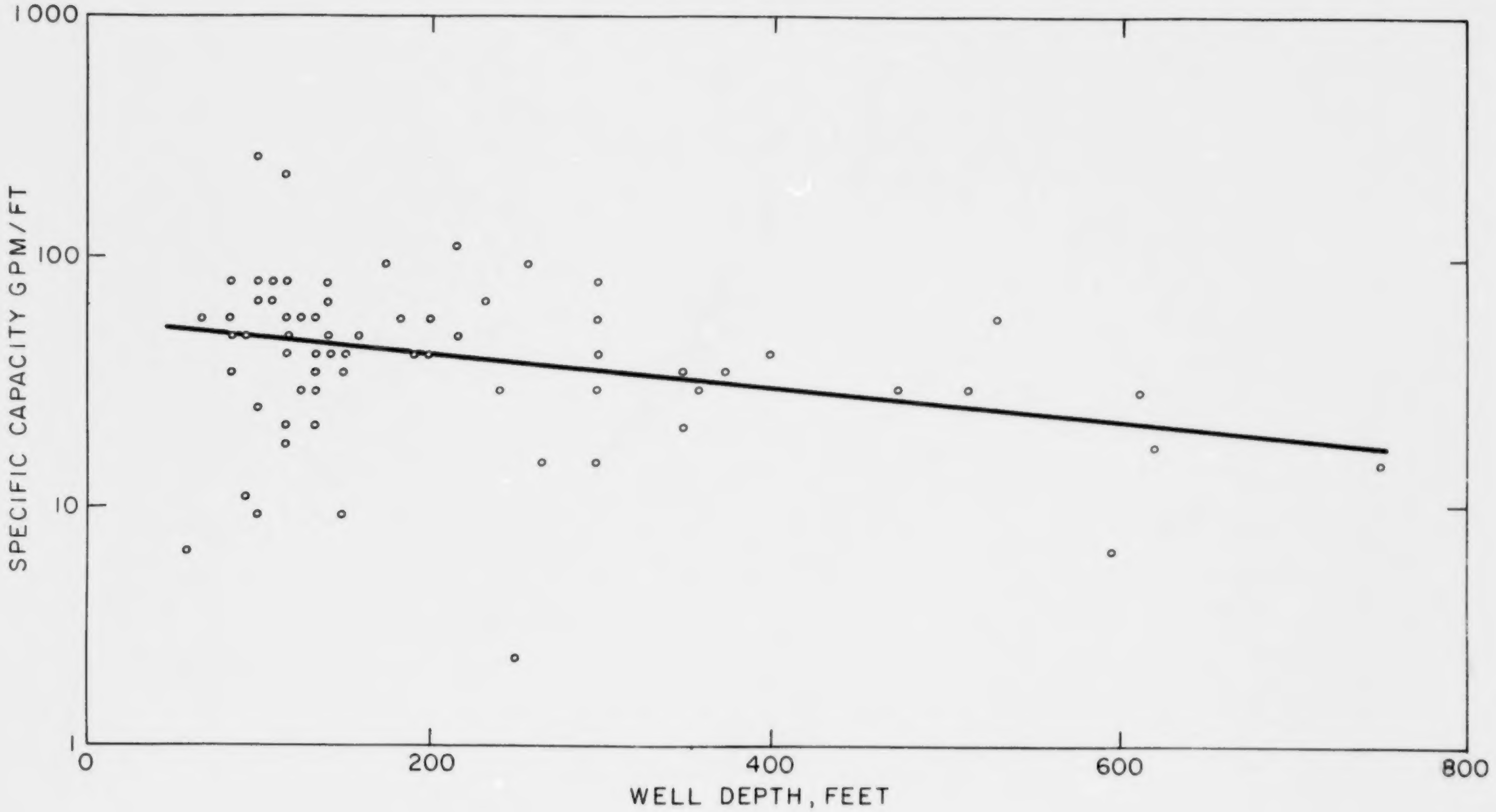


Figure 13. Specific capacity versus depth for 76 wells in the Mesilla Valley.

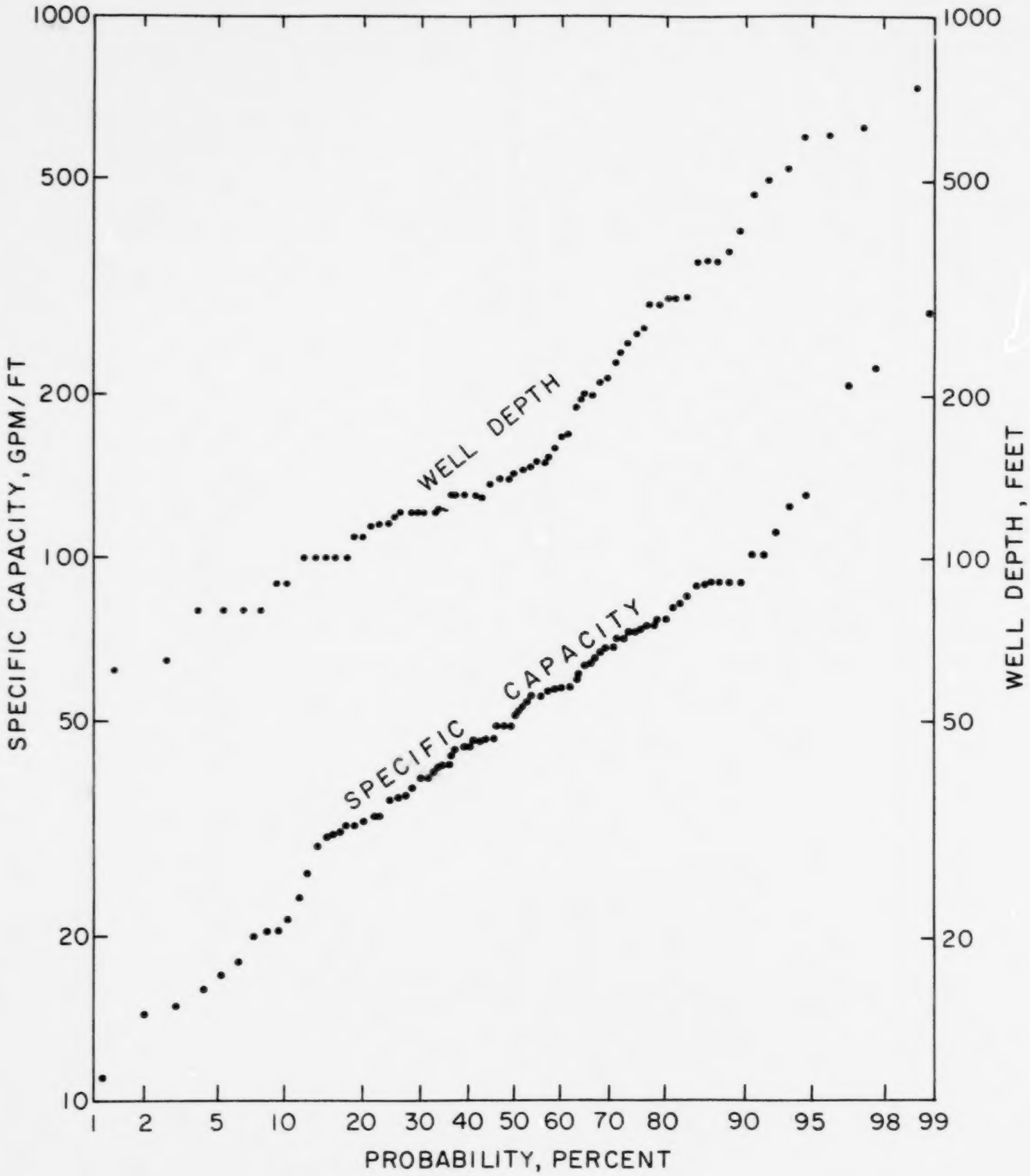


Figure 14. Log-normal probability plot of specific capacity and well depth.

the above flows are typically at least one order of magnitude less than the amount of water applied in the valley for irrigation (say 3.1×10^8 m^3/yr or 250,000 ac-ft/yr). Because of the secondary role of the other sources of inflow or outflow, their generally compensatory nature, and the difficulty in determining their influence on the alluvium, any explicit consideration of these sources in the model setup has been omitted.

CONSUMPTIVE USE

The crop consumptive use is one of the most important input parameters for the model. In preliminary calculations, two different methods were used to estimate the consumptive use. The modified Jensen-Haise method (Jensen, Robb and Franzoy, 1970) was applied using data on solar radiation and air temperature for Las Cruces, New Mexico, and El Paso, Texas, in the program EVPCOM which was also prepared by the U. S. Bureau of Reclamation (1974). The Jensen-Haise method, with cropping patterns of the Mesilla Valley, yields a consumptive use per area of crop land of about 107 cm/yr (3.5 ft/yr) (Table 3, Lansford, et al., 1976); this value is much higher than the commonly accepted estimate of around 61 cm/yr (2.0 ft/yr) based on the Blaney-Criddle equation (Henderson and Sorensen, 1968; Lansford, et al., 1973).

Measurements reported by Gregory and Hanson (1976) for alfalfa in the Mesilla Valley show an annual consumptive use of around 150 centimeters (5.0 feet); they found that their observations were in reasonable agreement with values computed by the Jensen-Haise method. In contrast, the Blaney-Criddle method (Blaney and Hanson, 1965) predicts a consumptive use of around 100 centimeters (3.0 feet) for alfalfa in the Mesilla Valley. On the other hand, recent lysimeter work (Al-Khafaf, 1977) with cotton in the Mesilla Valley yielded an annual consumptive use of 52 centimeters (1.7 feet) in 1976; the Blaney-Criddle method yields a consumptive use of about 61 centimeters (2.0 feet) for cotton in the same area (Blaney and Hanson, 1965). It is evident that the various methods of calculating consumptive use can yield quite divergent results and that similar differences have been observed by several independent workers. Hanson (personal communication, 1977) attributed some such differences to variations in water management and crop yield.

Because of the general uncertainty concerning the evaluation of consumptive use, the simple and widely accepted Blaney-Criddle method was chosen to estimate the consumptive use for input to the USBR-EPA mode. This method requires only mean monthly temperature and precipitation. The procedures of Blaney and Hanson (1965) were followed throughout the calculations using the crop coefficients and effective precipitation relationships which they suggest. Data on cropping acreage for each year were provided by New Mexico State University (Lansford, et al., 1978). In the USBR-EPA model simulations, these initial consumptive use estimates were further adjusted so that the simulated and observed aquifer water levels followed similar trends. Values of calculated consumptive use for each node of the model are listed in Appendix A.

SECTION 5

SIMULATION RESULTS AND CONCLUSIONS

MODEL PREPARATION

As noted previously, an initial trial aquifer thickness of 24 meters (80 feet) was selected on the basis of geological, aquifer, and chemical data. Because of the paucity of information regarding the quality and quantity of water from the deeper aquifer, pumpage from this deeper system was ignored in the modeling process. Instead all pumpage to supplement irrigation was assumed to originate in the shallow alluvial aquifer and to reflect its average chemistry.

Consumptive use for the cropped area, as predicted by the Blaney-Criddle method and adjusted to include effective precipitation, was further modified so as to minimize the rms error in average valley water levels. This modification was made using an average consumptive-use multiplier. Initial and modified values for consumptive use are listed with the input data in Appendix C. Allowance for effective precipitation slightly decreases the model input values for consumptive use, resulting in an average annual value of approximately 52.4 cm/yr (1.72 ft/yr), based on the yearly cropped acreage, or 82.9 cm/yr (2.72 ft/yr), based on monthly cropped acreage (see Appendix A for complete listing of consumptive use). Additionally, calculation of irrigation demand necessitates the estimation of an average irrigation efficiency for the valley. The often cited value of 50 percent was used (R. R. Lansford, personal communication, 1977), which is somewhat smaller than some field plot irrigation efficiencies cited by Blaney and Hanson (1965). This irrigation efficiency implies that one-half of the irrigation demand is used by the crops and one-half percolates through the soil root zone to the alluvial aquifer.

In most irrigation systems, some amount of water is lost from unlined canals before the water can be delivered to the fields. In this model, allowance was made for these losses via a delivery system efficiency factor, rather than actually specifying individual monthly values in each node (this feature was not originally available in the model but was incorporated here). The USBR-EPA model already has the capability of incorporating monthly irrigation losses to the river or to the aquifer, with or without being subject to soil column chemistry reactions. However, the model makes these loss calculations after first subtracting the consumptive use. The resulting water has a considerable higher dissolved solids content than applied water, whereas water derived from canal losses is expected to reflect the chemistry of applied water, before any modification by consumptive use. Thus, the model was modified to allow for a direct transfer of diverted river water to the aquifer by means of a delivery system efficiency factor. This factor was calculated to be 55 percent (USBR water distribution records, El Paso, Texas), which implies that 45 percent of a given monthly surface diversion is lost directly to the alluvial aquifer. The use of a delivery system loss factor is justified, at least in the Mesilla Valley, in that it attempts to more closely represent actual system water and mass transfers. This factor is user specified and remains constant throughout the simulation period.

The modeling process was initiated with shallow aquifer water quality data from Basler and Alary (1968) averaged for each node as discussed previously. Since no other compatible subsurface chemical data exists over the valley in the intervening years between 1967 and 1976, the model output was only compared against existing surface water quality data for the Rio Grande at El Paso, Texas, for the entire ten-year period.

SIMULATIONS

The ten-year period, 1967 through 1976, was used in the final simulations to evaluate the USBR-EPA model in the Mesilla Valley. The following factors were considered in these simulations:

(1) the influence of changes in consumptive use,
(2) the influence of including chemical reactions within the soil,
(3) the effect of increasing the aquifer depth, and
(4) the effect of improved irrigation efficiency.

Because of the uncertainty in the estimated consumptive use, its optimal value was obtained by minimizing the difference between the predicted and observed average water levels in the aquifer: it was found that the predicted average water level in the aquifer is very sensitive to the value chosen for consumptive use. Figure 15 illustrates water-level changes over the ten years during which the consumptive use is taken to be 1.6 and 1.7 times that determined by the Blaney-Criddle method. The results of several runs made to determine the optimal value of this comsumptive use multiplier are summarized in Figure 16. The root mean square (rms) error in predicted water level shows a very distinct minimum around 1.7; the rms error in predicted TDS shows a linear relationship, but is much less sensitive to the multiplier.

The multiplier of 1.7 implies an average consumptive use of around 89 cm/yr (2.92 ft/yr) based on the total cropped acreage, which average around 30,000 hectares (75,000 acres) over this period. However, the total area of the valley encompassing the alluvial aquifer was taken to be 43,874 hectares (108,412 acres); there are undoubtedly other significant sources of water consumption related to the additional area, such as phreatophytes, evaporation from water surfaces, and municipal depletions. If it is assumed that the same consumption rate applies over cropped and uncropped areas, the average consumptive use per acre of cropland is about 61 cm/yr (2.0 ft/yr). This estimate implies a net depletion; with an average effective precipitation of 19.1 centimeters (7.5 inches) (Blaney and Hanson, 1965), the total average consumption of water per acre of cropland would be about 79 centimeters (2.6 feet). Interestingly, Meyer and Gordon (1973) have estimated the crop consumptive use in the lower Mesilla Valley in Texas to be 79.6 and 82.0 centimeters depth per hectare (2.61 and 2.69 acre-feet per cropped acre) for 1970

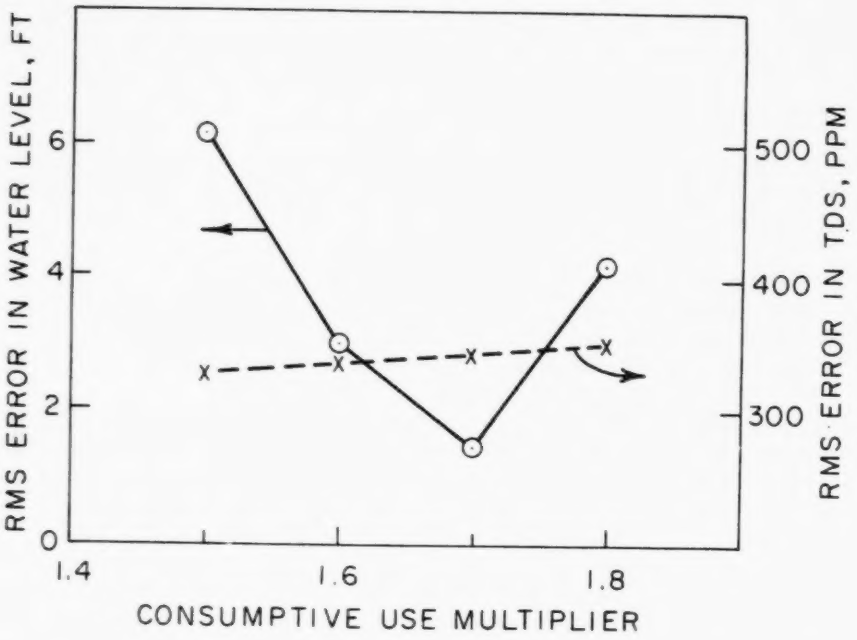


Figure 16. Root mean square error in simulated aquifer water levels and simulated outflow chemistry as function of consumptive use multiplier.

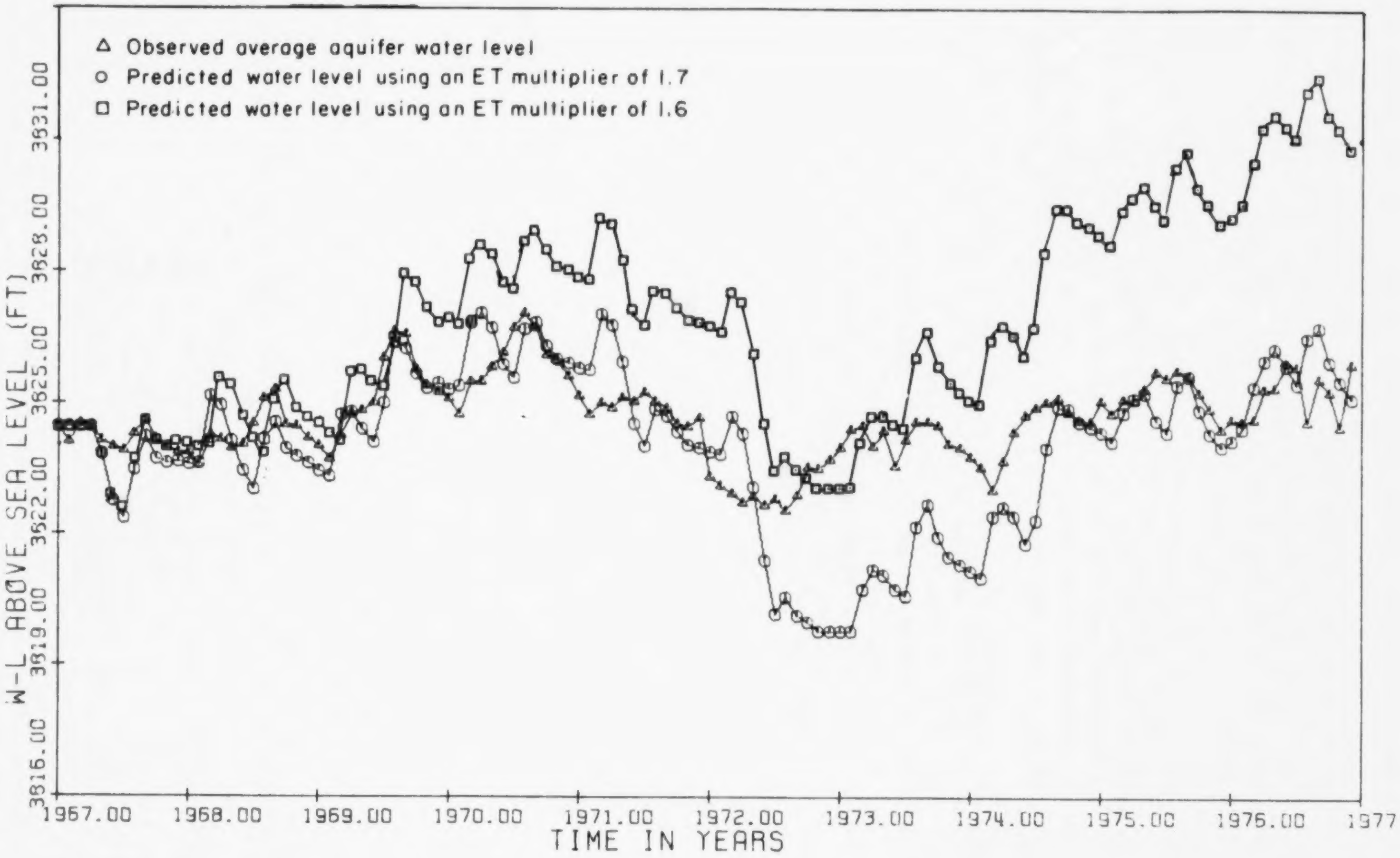


Figure 15. Simulated and average observed water-level changes, May,1967 - December,1976.

and 1971, respectively.

Once the optimum value for consumptive use was selected, the effects of the previously mentioned factors were examined using the same ten-year simulation period. With the consumptive use multiplier of 1.7 and a water delivery system efficiency estimated to average 55 percent, the following simulations were made:

(1) an initial irrigation efficiency of 50 percent and an average aquifer saturated thickness of 24 meters (80 feet);
(2) an initial irrigation efficiency of 50 percent and an average aquifer saturated thickness of 46 meters (150 feet); and
(3) an increase in irrigation efficiency from 50 percent to 75 percent, using an average aquifer saturated thickness of 24 meters (80 feet).

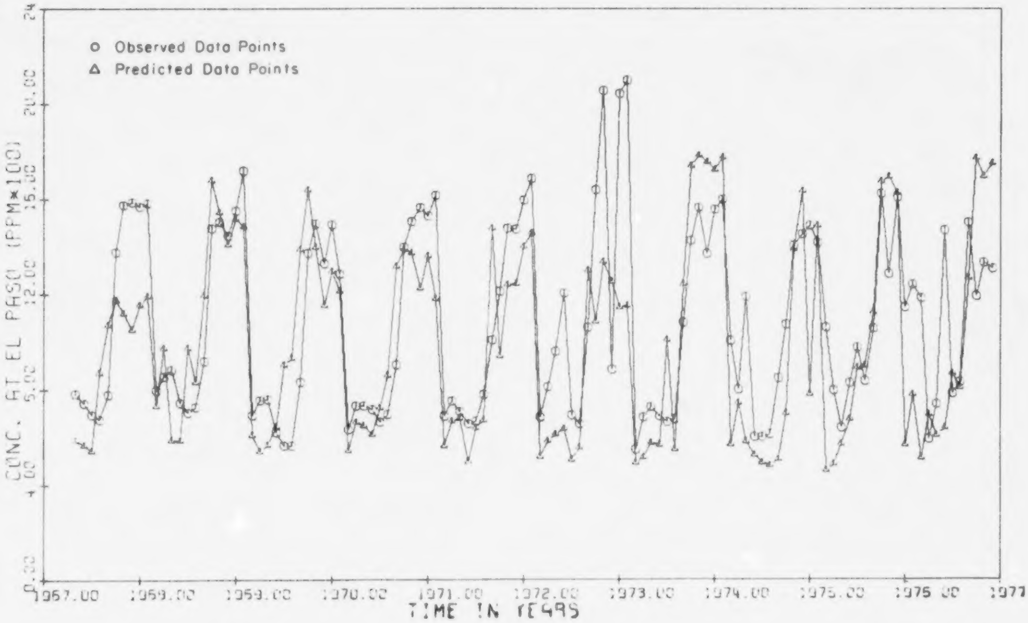
Two computer runs were made for each of the above cases. The first run took into account chemical reactions within the soil zone, while the second run was made without such reactions. The effects of soil zone chemical reaction simulations could therefore be directly evaluated under several varying conditions. For all cases, the time history of average predicted water levels remains unchanged, as any change in infiltrated water must be equal to a change in pumpage (surface diversions are constrained by observation and consumptive use by the aforementioned optimization procedure). Thus, the time history of predicted water levels for all cases is identical to that of Figure 15 with a consumptive use multiplier of 1.7.

Figures 17 through 19 show a comparison of predicted and observed total dissolved solids for the various cases examined. The predicted TDS values are compared with observed data in the Rio Grande at El Paso, Texas, over the ten-year simulation period. It can be seen that the model simulates the observed seasonal variation in water quality quite well for all cases. This seasonal pattern seems to be related to the fact that the relatively high salinity groundwater, which drains from the aquifer after the irrigation season, is the predominate source of flow during the winter months. However, in the early part of the growing season, large quantities of relatively low salinity surface diversions are applied; these waters tend to dilute the drainage waters.

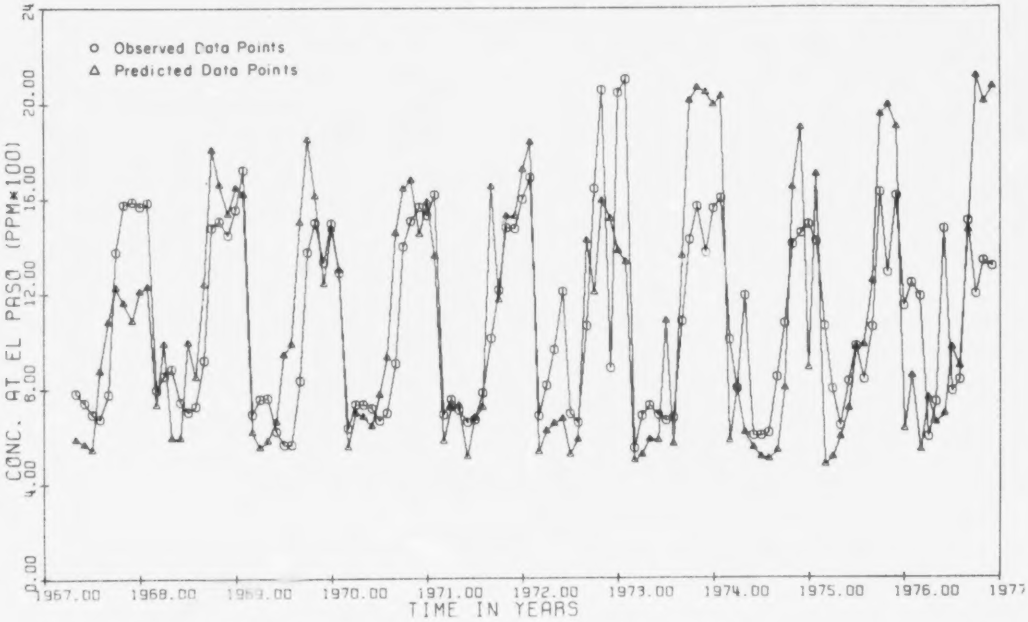
Table 4 shows a summary of results for the simulation cases considered. Figures 17 and 18 seem to indicate that the USBR-EPA model reproduces the

TABLE 4. COMPARISON OF RESULTS AS MEASURED BY RMS ERROR IN TDS

Aquifer depth meters	(feet)	Soil chemistry	Irrigation efficiency %	rms error in TDS ppm
24	(80)	yes	50	344
24	(80)	yes	75	329
24	(80)	no	50	319
24	(80)	no	75	328
46	(150)	yes	50	328
46	(150)	no	50	330

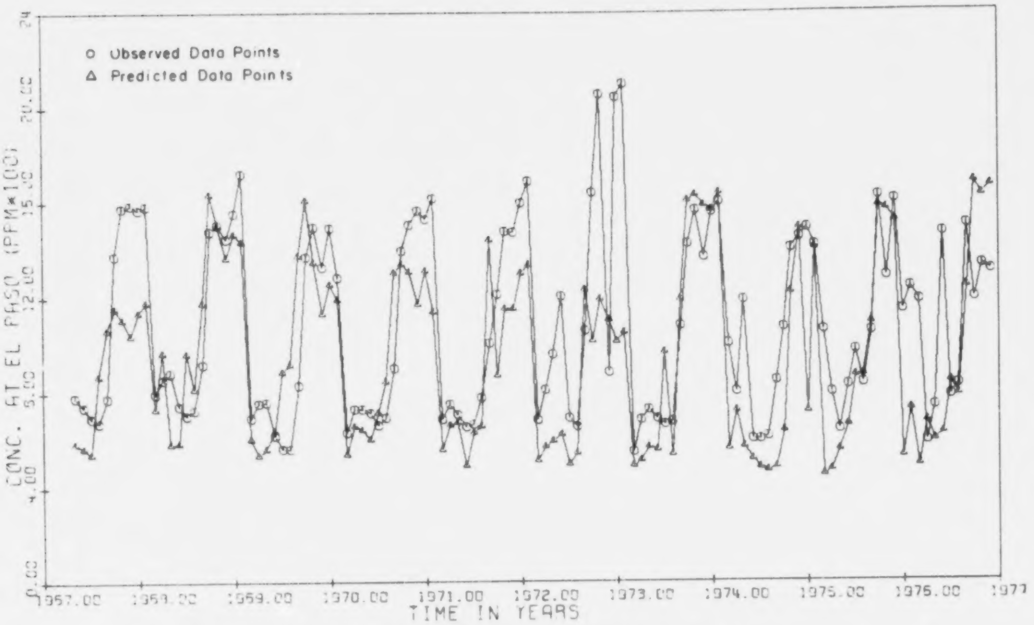


(a) Without soil column chemical reactions

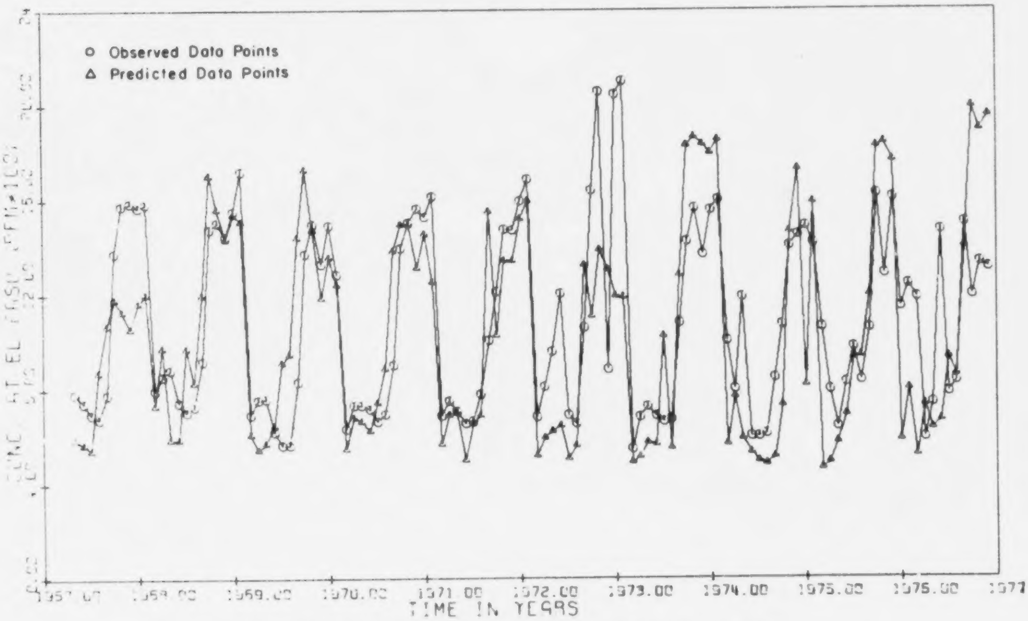


(b) With soil column chemical reactions

Figure 17. Observed and predicted TDS using an alluvial aquifer 24 meters (80 feet) thick and irrigation efficiency of 50%.

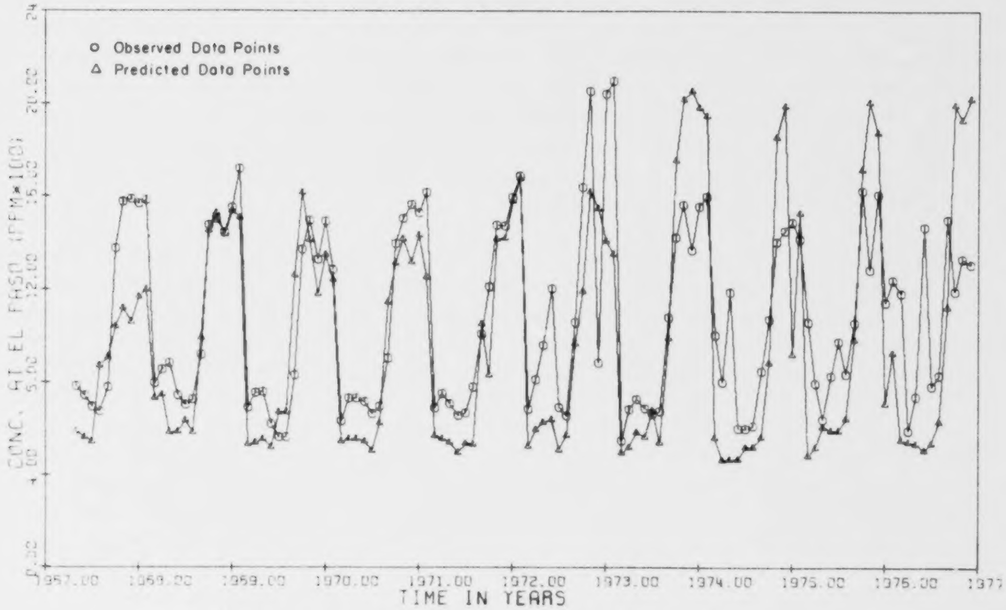


(a) Without soil column chemical reactions

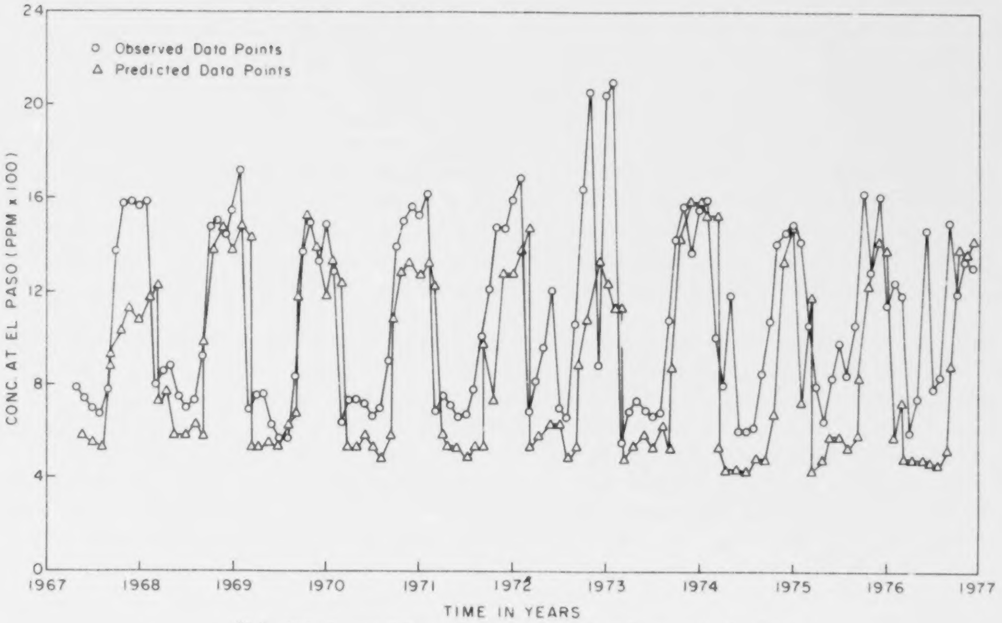


(b) With soil column chemical reactions

Figure 18. Observed and predicted TDS using an alluvial aquifer 46 meters (150 feet) thick and irrigation efficiency of 50%.



(a) Without soil column chemical reactions



(b) With soil column chemical reactions

Figure 19. Observed and predicted TDS using an alluvial aquifer 24 meters (46 feet) thick and irrigation efficiency of 75%.

total dissolved solids in the Rio Grande at El Paso slightly better when soil chemistry effects are not included in the model, especially toward the end of a given simulation run. This is true for both aquifer depths considered, though the rms error between observed and predicted TDS for an alluvial thickness of 24 meters (80 feet) is somewhat lower than when it is taken to be 46 meters (150 feet). The rms error from both cases, however, is still relatively small. It would thus appear that the aquifer thickness is not a major parameter in the USBR-EPA model simulations.

Comparison of Figures 17a and 17b shows that inclusion of the soil-water chemical interaction effects in the USBR-EPA model has a significant effect on the predicted TDS in the Rio Grande, although this effect is not evident in the first few years of the simulation. This observation emphasizes the slow chemical response of soil-aquifer systems in general. The influence of the soil-water chemical reactions is most important when the irrigation efficiency is increased from 50 percent to 75 percent as illustrated by Figures 19a and 19b. The results with and without the model soil column reactions differ importantly in these cases; the conservative system (i.e., without the model soil column reactions) with a 75 percent efficiency indicates a significant predicted TDS increase in the Rio Grande at El Paso over that for the 50 percent efficiency case. On the other hand, the more complete description with soil chemistry effects included shows a definite predicted TDS decrease in the Rio Grande, especially towards the end of the simulation period.

The simulation results indicate that a significant decrease in the Rio Grande TDS at El Paso would have occurred if the irrigation efficiency had been increased to 75 percent for the period of 1967 to 1976, if we accept the more complete model with soil chemistry reactions. Comparison of the simulation results with soil column chemical reactions in Figures 17b and 19b shows that in the last four years of the ten year simulation period the average maximum TDS in the Rio Grande was typically about 550 ppm lower with the higher irrigation efficiency. This management option appears to be a viable method for improving downstream water quality. The technique does, however, take some time before giving any noticeable improvements in water quality. In the Mesilla Valley, this time period would apparently have been about six years.

All of the above simulations were made with the USBR-EPA model as represented by the FORTRAN listing in Appendix B. Only minor changes of input data are required to simulate the various cases presented above. A typical listing of input data and output are shown in Appendix C for the case with 50 percent irrigation efficiency with soil chemical reactions. To exclude the soil chemistry, monthly CONUSE cards are changed as indicated in the data listing, Appendix C. A complete program source listing with ten-year data input and simulation output for the Mesilla Valley is available on microfilm form the Environmental Protection Agency, Ada, Oklahoma. Appendix C lists only the first two months of data input and simulation output for the valley. The aquifer depth is changed simply by altering the initial volume of water in the aquifer. Changes in irrigation efficiency are introduced as indicated in the program listing in Appendix B; changes in the water delivery system efficiency can also be changed as indicated in Appendix B.

The results of the above simulations demonstrate that the USBR-EPA model can simulate pre-existing conditions quite well if adequate data are available to describe the overall water balance and the conditions of the aquifer. The experience with the Mesilla Valley system indicates that the overall data on flow are quite reliable and consistent. The resolution of the groundwater quantity data also seems adequate, but the groundwater quality shows a very high degree of horizontal spatial variability. The vertical extent of the higher salinity groundwater is not well defined. For example, is one additional well (USBR Well No. 34) were included in the calculation of average aquifer quality, the initial dissolved solids concentration would be increased over 300 ppm.

The actual predictive capabilities of the USBR-EPA model are less clear. In order to predict the effects of changes in water application, one must be able to synthesize the resulting changes of flow in and out of the system. Because the USBR-EPA model completely ignores the dynamics of flow in the aquifer (e.g., no aquifer hydraulic properties are used in the model), changes in outflow which result from changes in aquifer water level are not simulated by the model. For example, in the Mesilla Valley simulations, the flow of the Del Rio drain appears as a flow transfer from node 1 to node 2. When the simulation for improved irrigation efficiency was developed, it was necessary to make some assumption about this flow as input data for the model. The drain flow was arbitrarily assumed to be unchanged. Because of features such as this, the predictive capabilities of the USBR-EPA model may be quite limited in some situations. If reliable information is available on how the water balance and flow conditions will change, the USBR-EPA model can provide reasonable predictions. However, this is just another way of saying that the model is not complete in its description of flow dynamics.

These features may seem to suggest that the USBR-EPA model should be modified to incorporate some dynamic characteristics of the groundwater flow. However, it is not suggested that the present model be modified because it is generally very difficult to use, especially if any changes of program structure are required. The documentation of the computer program was not considered to be adequate for most users.

Considering the very simple conceptual framework of the USBR-EPA model (i.e., the aquifer in each node is simply a mixing cell), the computer program seems unnecessarily complicated. Models which incorporate the mixing cell structure plus the flow dynamics of the aquifer are already available (Gelhar and Wilson, 1974), and have been applied with reasonable success to the irrigation return flow situation in the Arkansas River Valley near La Junta, Colorado (McLin, 1978). These models can be operated with much simplier computer programs; the calculations can be performed quite conveniently on a programable pocket calculator.

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APPENDIX A

A. MESILLA VALLEY INPUT DATA FOR THE USBR-EPA MODEL

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1967

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	42150.	74.	15.	92.	71.	200.	90.	0.	0.	517.
6	47930.	72.	15.	88.	68.	192.	89.	0.	0.	499.
7	70069.	48.	1.	93.	60.	188.	179.	0.	1.	1721.
8	79419.	80.	13.	188.	103.	413.	70.	0.	1.	816.
9	56609.	40.	12.	200.	106.	433.	100.	0.	1.	816.
10	5030.	80.	11.	200.	120.	455.	60.	0.	1.	838.
11	3860.	130.	10.	170.	200.	370.	210.	0.	1.	1037.
12	3770.	150.	9.	165.	177.	375.	150.	0.	0.	1221.

INFORMATION SOURCE: USBR; EL PASO, TEXAS
NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1968

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	1690.	160.	15.	160.	191.	400.	200.	0.	0.	1118.
2	3220.	160.	15.	215.	199.	340.	210.	0.	3.	1140.
3	84110.	60.	11.	115.	99.	310.	140.	0.	1.	662.
4	45220.	80.	10.	115.	78.	320.	160.	0.	0.	721.
5	43700.	80.	9.	80.	21.	280.	140.	0.	3.	662.
6	90560.	62.	10.	120.	4.	260.	210.	0.	1.	600.
7	79640.	84.	17.	100.	75.	294.	109.	0.	0.	628.
8	78930.	68.	14.	83.	61.	241.	89.	0.	0.	514.
9	45090.	86.	17.	106.	81.	304.	106.	0.	0.	649.
10	3320.	95.	20.	125.	113.	350.	83.	0.	0.	747.
11	2060.	121.	25.	161.	150.	445.	100.	0.	0.	954.
12	1570.	120.	25.	161.	153.	443.	95.	0.	0.	953.

INFORMATION SOURCE: USBR; EL PASO, TEXAS

NOTE: INDIVIDUAL ION CONCENTRATIONS FROM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1969

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	875.	112.	23.	154.	151.	412.	83.	0.	0.	897.
2	540.	116.	24.	160.	162.	427.	82.	0.	0.	933.
3	92460.	70.	14.	84.	61.	243.	93.	0.	0.	520.
4	62990.	67.	13.	82.	61.	236.	86.	0.	0.	505.
5	56990.	69.	13.	84.	64.	241.	86.	0.	0.	517.
6	101800.	66.	14.	80.	58.	233.	91.	0.	0.	500.
7	123130.	69.	13.	83.	60.	238.	97.	0.	0.	515.
8	126690.	69.	13.	83.	60.	238.	97.	0.	0.	515.
9	42644.	89.	18.	110.	85.	317.	109.	0.	0.	676.
10	5160.	156.	32.	203.	179.	568.	145.	0.	0.	1213.
11	3940.	165.	35.	216.	193.	608.	148.	0.	0.	1294.
12	9810.	139.	29.	179.	150.	510.	141.	0.	0.	1080.

INFORMATION SOURCE: USBR; EL PASO, TEXAS

NOTE: INDIVIDUAL ION CONCENTRATIONS FROM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1970

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	2710.	142.	30.	188.	172.	523.	121.	0.	0.	1118.
2	7880.	153.	31.	197.	168.	556.	153.	0.	0.	1184.
3	95540.	69.	14.	84.	62.	242.	94.	0.	0.	520.
4	69430.	67.	14.	81.	61.	236.	87.	0.	0.	505.
5	72980.	68.	14.	83.	61.	241.	89.	0.	0.	515.
6	92490.	67.	13.	81.	59.	232.	90.	0.	0.	500.
7	124040.	61.	12.	74.	53.	211.	86.	0.	0.	456.
8	106080.	60.	12.	72.	52.	209.	82.	0.	0.	449.
9	51570.	98.	20.	120.	91.	349.	123.	0.	0.	743.
10	6640.	140.	28.	181.	157.	511.	134.	0.	0.	1088.
11	2500.	147.	30.	196.	180.	544.	125.	0.	0.	1162.
12	2650.	130.	27.	173.	159.	481.	111.	0.	0.	1029.

INFORMATION SOURCE: USBR; EL PASO, TEXAS
NOTE: INDIVIDUAL ION CONCENTRATIONS FORM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1971

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	2060.	129.	26.	173.	160.	477.	106.	0.	0.	1022.
2	2680.	131.	27.	174.	158.	481.	113.	0.	0.	1029.
3	94150.	73.	14.	88.	64.	254.	97.	0.	0.	544.
4	50390.	65.	13.	80.	61.	230.	82.	0.	0.	493.
5	53760.	64.	13.	78.	59.	228.	80.	0.	0.	485.
6	73080.	60.	12.	73.	55.	212.	80.	0.	0.	456.
7	82600.	66.	13.	80.	59.	230.	87.	0.	0.	493.
8	72390.	61.	12.	74.	56.	216.	80.	0.	0.	463.
9	25530.	93.	19.	115.	91.	333.	105.	0.	0.	706.
10	3550.	34.	7.	45.	41.	127.	30.	0.	0.	272.
11	1320.	111.	23.	149.	143.	410.	86.	0.	0.	882.
12	1280.	111.	23.	150.	144.	409.	86.	0.	0.	882.

INFORMATION SOURCE: USBR; EL PASO, TEXAS
NOTE: INDIVIDUAL ION CONCENTRATIONS FROM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1972

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	776.	113.	23.	155.	153.	416.	82.	0.	0.	904.
2	369.	113.	23.	158.	163.	414.	76.	0.	0.	912.
3	77110.	64.	13.	78.	57.	228.	84.	0.	0.	485.
4	34180.	64.	13.	79.	61.	228.	75.	0.	0.	485.
5	18140.	61.	12.	77.	63.	221.	67.	0.	0.	471.
6	16550.	62.	12.	79.	64.	224.	67.	0.	0.	478.
7	53150.	58.	12.	71.	54.	207.	73.	0.	0.	441.
8	45470.	63.	13.	78.	59.	224.	78.	0.	0.	478.
9	12140.	98.	20.	125.	104.	357.	102.	0.	0.	757.
10	3790.	105.	22.	138.	124.	385.	94.	0.	0.	824.
11	776.	114.	23.	156.	154.	420.	83.	0.	0.	912.
12	706.	88.	18.	121.	120.	324.	63.	0.	0.	706.

INFORMATION SOURCE: USBR; EL PASO, TEXAS

NOTE: INDIVIDUAL ION CONCENTRATIONS FROM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1973

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	680.	77.	16.	106.	105.	284.	55.	0.	0.	618.
2	692.	103.	21.	141.	140.	379.	75.	0.	0.	824.
3	63980.	65.	13.	78.	59.	226.	83.	0.	0.	485.
4	67400.	67.	14.	82.	61.	237.	87.	0.	0.	507.
5	65380.	73.	15.	89.	67.	259.	94.	0.	0.	552.
6	91760.	70.	14.	84.	61.	243.	93.	0.	0.	522.
7	84180.	61.	12.	74.	54.	212.	81.	0.	0.	456.
8	123380.	65.	13.	78.	56.	224.	91.	0.	0.	485.
9	68770.	70.	14.	86.	64.	247.	91.	0.	0.	529.
10	6250.	120.	25.	156.	136.	443.	115.	0.	0.	941.
11	912.	140.	29.	191.	186.	517.	104.	0.	0.	1118.
12	922.	149.	31.	203.	199.	551.	110.	0.	0.	1191.

INFORMATION SOURCE: USBR; EL PASO, TEXAS
NOTE: INDIVIDUAL ION CONCENTRATIONS FROM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1974

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	980.	136.	28.	185.	181.	503.	102.	0.	0.	1088.
2	647.	122.	25.	168.	167.	449.	88.	0.	0.	978.
3	101050.	71.	14.	85.	62.	248.	97.	0.	0.	532.
4	68300.	52.	11.	64.	48.	186.	68.	0.	0.	397.
5	74570.	56.	11.	67.	50.	196.	72.	0.	0.	419.
6	112780.	56.	11.	67.	48.	195.	77.	0.	0.	419.
7	100500.	59.	12.	70.	52.	205.	80.	0.	0.	441.
8	97590.	56.	11.	67.	50.	195.	75.	0.	0.	419.
9	54520.	54.	11.	66.	50.	194.	68.	0.	0.	412.
10	11600.	53.	11.	68.	57.	194.	55.	0.	0.	412.
11	1760.	106.	22.	142.	132.	391.	86.	0.	0.	838.
12	1230.	139.	29.	188.	181.	511.	107.	0.	0.	1103.

INFORMATION SOURCE: USBR; EL PASO, TEXAS

NOTE: INDIVIDUAL ION CONCENTRATIONS FROM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1975

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	7200.	53.	11.	68.	59.	194.	51.	0.	0.	412.
2	3580.	59.	12.	77.	69.	217.	53.	0.	0.	463.
3	65550.	54.	11.	67.	50.	193.	70.	0.	0.	412.
4	72260.	56.	11.	68.	51.	200.	74.	0.	0.	426.
5	79940.	69.	14.	82.	61.	241.	90.	0.	0.	515.
6	92680.	69.	14.	83.	61.	239.	93.	0.	0.	515.
7	96020.	67.	13.	81.	59.	232.	90.	0.	0.	500.
8	101720.	65.	13.	78.	57.	226.	88.	0.	0.	485.
9	64160.	73.	15.	89.	67.	258.	94.	0.	0.	551.
10	5310.	50.	10.	65.	57.	183.	46.	0.	0.	390.
11	1280.	49.	10.	66.	63.	181.	38.	0.	0.	390.
12	1710.	52.	10.	69.	65.	191.	42.	0.	0.	412.

INFORMATION SOURCE: USBR; EL PASO, TEXAS

NOTE: INDIVIDUAL ION CONCENTRATIONS FROM JULY 1968 TO DECEMBER 1975 ARE ESTIMATED. SEE APPENDIX D FOR COMPLETE DETAILS, ALL OTHER DATA IS OBSERVED.

(Continued)

TABLE A1. RIO GRANDE FLOW AND WATER QUALITY ABOVE LEASBURG DAM FOR 1976

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	19980.	46.	9.	58.	43.	174.	47.	0.	0.	357.
2	21580.	69.	14.	87.	66.	259.	69.	0.	0.	532.
3	82430.	56.	11.	68.	61.	198.	49.	0.	0.	420.
4	85800.	56.	11.	69.	62.	202.	50.	0.	0.	427.
5	104010.	58.	12.	70.	65.	207.	52.	0.	0.	441.
6	95840.	58.	12.	70.	65.	208.	51.	0.	0.	441.
7	87300.	53.	10.	64.	58.	190.	47.	0.	0.	402.
8	109440.	59.	12.	71.	66.	209.	51.	0.	0.	445.
9	50430.	59.	12.	73.	62.	216.	56.	0.	0.	452.
10	4020.	86.	18.	113.	69.	343.	101.	0.	0.	682.
11	1650.	99.	20.	132.	73.	399.	125.	0.	0.	788.
12	1230.	113.	23.	152.	80.	458.	147.	0.	0.	903.

INFORMATION SOURCE: USBR; EL PASO, TEXAS

TABLE A2. IRRIGATION DIVERSION AT LEASBURG DAM

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1967	9	0	18157	5903	5990	6969	13516	13317	15439	2520	1310	0
1968	0	140	11185	8740	5187	14459	16455	17732	13974	2980	972	0
1969	0	0	19752	10703	8121	17361	26039	29759	10471	3950	1400	0
1970	0	1444	18021	13374	13099	16797	27083	25148	16545	4030	1211	0
1971	0	0	17522	7724	7407	11454	16548	17274	10189	1120	0	0
1972	0	0	9578	3319	1199	2281	8208	8859	3539	40	0	0
1973	0	0	7944	11287	9021	15879	14612	21800	17252	4455	0	0
1974	0	0	17171	15093	14647	21630	13482	17258	12580	119	0	0
1975	0	1010	9361	11604	13111	16382	20722	19684	12908	2285	0	0
1976	273	3001	14199	16016	16145	17937	19351	21928	15493	2920	0	0

INFORMATION SOURCE: USBR; EL PASO, TEXAS

NOTE: NET SUPPLY MINUS TOTAL WASTES REPORTED HERE. ALL UNITS ARE IN AC-FT/MONTH.

TABLE A3. IRRIGATION DIVERSION AT MESILLA DAM

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1967	33	0	35407	14462	13474	13404	23400	26819	20802	0	0	0
1968	0	0	27348	16803	14558	27033	31197	38152	19882	0	0	0
1969	0	0	34262	20634	20443	38812	50376	56266	20576	0	0	0
1970	0	1321	32846	24405	25220	33220	45232	45419	22930	143	0	0
1971	0	0	35315	17119	18673	25750	32129	33000	12540	0	0	0
1972	0	0	26183	10726	4935	5617	20513	17481	3424	0	0	0
1973	0	0	20629	22811	21594	34075	35891	46990	33606	225	0	0
1974	0	0	36440	26123	27982	39317	36355	37084	19946	39	0	0
1975	524	859	23553	22613	25941	33538	41192	43831	25371	1735	0	0
1976	8530	14996	32185	30109	35756	35815	36988	46158	23596	99	0	0

INFORMATION SOURCE: USBR; EL PASO, TEXAS

NOTE: NET SUPPLY MINUS NET TO RIVER REPORTED HERE. ALL UNITS ARE IN AC-FT/MONTH.

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1967

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	24209.	91.	18.	154.	121.	280.	204.	12.	1.	831.
6	25298.	90.	18.	144.	113.	258.	232.	0.	2.	805.
7	31663.	85.	17.	135.	105.	240.	223.	0.	1.	756.
8	36122.	91.	16.	123.	94.	233.	196.	7.	3.	692.
9	27475.	90.	17.	149.	112.	300.	204.	0.	1.	822.
10	5094.	123.	26.	317.	255.	491.	305.	0.	2.	1443.
11	2522.	129.	31.	381.	312.	549.	333.	0.	3.	1662.
12	2809.	125.	28.	388.	314.	560.	310.	7.	3.	1685.

INFORMATION SOURCE: USBR; EL PASO

NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1968

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	2778.	122.	28.	383.	308.	562.	311.	0.	1.	1629.
2	1878.	101.	29.	407.	335.	573.	189.	35.	0.	1669.
3	39553.	98.	20.	147.	126.	307.	192.	0.	0.	847.
4	27271.	101.	20.	169.	151.	303.	217.	0.	1.	924.
5	23465.	100.	20.	176.	133.	337.	226.	0.	0.	926.
6	41408.	91.	18.	139.	97.	287.	214.	0.	0.	770.
7	46582.	85.	17.	135.	97.	256.	217.	0.	1.	728.
8	40721.	89.	17.	142.	106.	258.	226.	0.	1.	776.
9	23895.	111.	17.	185.	150.	324.	257.	0.	1.	972.
10	6630.	132.	31.	342.	284.	532.	306.	0.	1.	1540.
11	5000.	135.	34.	344.	284.	539.	327.	0.	1.	1567.
12	5227.	126.	25.	333.	286.	534.	195.	30.	0.	1503.

INFORMATION SOURCE: USBR; EL PASO

NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1969

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	4687.	140.	30.	355.	306.	555.	310.	0.	3.	1653.
2	2571.	134.	35.	417.	351.	618.	314.	0.	4.	1831.
3	42307.	97.	14.	126.	112.	240.	205.	0.	1.	750.
4	33723.	92.	16.	144.	108.	283.	212.	0.	1.	807.
5	30947.	93.	18.	143.	109.	278.	228.	0.	1.	811.
6	52791.	84.	15.	110.	80.	224.	207.	0.	0.	671.
7	67715.	76.	13.	102.	73.	197.	201.	0.	1.	608.
8	69244.	77.	13.	101.	76.	196.	197.	0.	0.	621.
9	36607.	105.	19.	158.	125.	305.	237.	0.	1.	894.
10	10842.	139.	27.	295.	246.	506.	300.	0.	1.	1448.
11	6793.	143.	31.	335.	273.	548.	322.	0.	1.	1584.
12	7180.	114.	20.	314.	265.	516.	187.	0.	0.	1396.

INFORMATION SOURCE: USBR; EL PASO

NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1970

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	5599.	146.	27.	327.	278.	542.	318.	0.	1.	1561.
2	5572.	128.	20.	289.	238.	452.	294.	0.	1.	1339.
3	46386.	85.	16.	110.	90.	229.	196.	0.	0.	645.
4	38232.	91.	16.	137.	101.	270.	220.	0.	0.	743.
5	40803.	96.	17.	135.	101.	270.	224.	0.	0.	750.
6	46775.	96.	17.	131.	99.	261.	226.	0.	0.	737.
7	67260.	88.	16.	116.	96.	230.	220.	0.	0.	676.
8	54217.	91.	16.	129.	98.	246.	228.	0.	0.	718.
9	31756.	104.	20.	174.	140.	326.	256.	0.	0.	925.
10	7087.	117.	27.	331.	271.	502.	285.	0.	0.	1449.
11	3932.	138.	30.	332.	275.	562.	308.	0.	0.	1530.
12	3891.	132.	33.	360.	320.	570.	280.	0.	0.	1590.

INFORMATION SOURCE: USBR; EL PASO

NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1971

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	5008.	131.	32.	351.	295.	566.	290.	0.	0.	1560.
2	3187.	131.	32.	381.	310.	590.	320.	0.	0.	1640.
3	43173.	94.	17.	125.	106.	234.	224.	0.	0.	695.
4	30835.	91.	17.	140.	110.	270.	230.	0.	0.	797.
5	33571.	88.	16.	138.	107.	234.	244.	0.	0.	743.
6	37097.	84.	15.	124.	94.	219.	230.	0.	0.	687.
7	39612.	83.	16.	129.	99.	222.	232.	0.	0.	699.
8	28088.	90.	18.	159.	126.	264.	242.	0.	0.	854.
9	13143.	105.	21.	216.	173.	358.	260.	0.	0.	1120.
10	4817.	112.	24.	282.	220.	432.	278.	0.	0.	1210.
11	2849.	120.	28.	354.	276.	536.	308.	0.	0.	1480.
12	2776.	120.	28.	354.	284.	528.	304.	0.	0.	1470.

INFORMATION SOURCE: USBR; EL PASO

NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1972

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	2495.	125.	30.	384.	305.	578.	324.	0.	0.	1600.
2	1740.	121.	30.	429.	335.	598.	336.	0.	0.	1690.
3	33845.	86.	16.	128.	116.	227.	212.	0.	0.	685.
4	16312.	95.	18.	156.	128.	284.	240.	0.	0.	807.
5	8898.	96.	19.	209.	172.	334.	244.	0.	1.	961.
6	7165.	96.	22.	289.	240.	426.	244.	0.	0.	1200.
7	24670.	81.	14.	138.	112.	223.	228.	0.	1.	692.
8	21144.	79.	13.	130.	105.	218.	208.	0.	1.	659.
9	10440.	100.	17.	247.	202.	372.	236.	0.	1.	1070.
10	5133.	116.	26.	420.	340.	574.	310.	0.	0.	1640.
11	917.	124.	35.	552.	450.	712.	356.	0.	0.	2060.
12	809.	97.	19.	183.	146.	316.	236.	0.	0.	926.

INFORMATION SOURCE: USBR; EL PASO
NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1973

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	465.	103.	34.	565.	462.	710.	318.	0.	0.	2040.
2	344.	112.	35.	570.	475.	722.	342.	0.	0.	2090.
3	24938.	78.	13.	94.	100.	163.	190.	0.	1.	552.
4	30401.	88.	16.	128.	99.	255.	192.	0.	0.	688.
5	31252.	90.	17.	135.	104.	266.	218.	0.	0.	727.
6	44299.	84.	16.	127.	90.	254.	218.	0.	1.	688.
7	53276.	84.	17.	122.	89.	242.	212.	0.	0.	665.
8	58592.	84.	17.	126.	96.	238.	220.	0.	1.	680.
9	38158.	118.	23.	222.	182.	382.	290.	0.	0.	1080.
10	10008.	118.	27.	339.	278.	512.	288.	0.	0.	1478.
11	5512.	124.	29.	379.	311.	562.	301.	0.	0.	1618.
12	4544.	116.	26.	323.	264.	491.	282.	0.	0.	1419.

INFORMATION SOURCE: USBR; EL PASO

NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1974

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	4270.	120.	30.	370.	290.	580.	306.	0.	0.	1574.
2	3712.	130.	32.	390.	320.	570.	316.	0.	0.	1640.
3	49334.	102.	21.	218.	176.	360.	247.	0.	0.	1050.
4	35722.	94.	17.	158.	126.	285.	228.	0.	0.	840.
5	36454.	109.	24.	271.	221.	427.	265.	0.	0.	1239.
6	56888.	86.	14.	101.	77.	213.	208.	0.	0.	637.
7	47254.	79.	13.	110.	78.	190.	212.	16.	0.	819.
8	44018.	85.	15.	110.	79.	210.	220.	0.	0.	770.
9	25925.	97.	21.	160.	130.	300.	254.	0.	0.	836.
10	7087.	110.	27.	230.	190.	380.	266.	0.	0.	1138.
11	3932.	120.	35.	310.	260.	520.	292.	0.	0.	1592.
12	3891.	119.	28.	347.	285.	522.	290.	0.	0.	1505.

INFORMATION SOURCE: USBR; EL PASO
NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1975

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	9070.	121.	28.	357.	293.	534.	294.	0.	0.	1540.
2	6703.	118.	27.	337.	276.	509.	287.	0.	0.	1470.
3	32145.	104.	21.	234.	189.	380.	253.	0.	0.	1106.
4	38402.	93.	17.	157.	125.	284.	227.	0.	0.	836.
5	41462.	87.	15.	112.	87.	227.	212.	0.	0.	676.
6	49837.	95.	18.	166.	133.	295.	230.	0.	0.	868.
7	49144.	101.	20.	210.	169.	350.	245.	0.	0.	1022.
8	55585.	95.	18.	169.	135.	299.	231.	0.	0.	878.
9	47040.	104.	21.	233.	188.	378.	252.	0.	0.	1102.
10	13446.	126.	30.	397.	326.	584.	307.	0.	0.	1680.
11	9047.	113.	25.	299.	244.	462.	274.	0.	0.	1337.
12	8880.	126.	30.	391.	322.	578.	305.	0.	0.	1662.

INFORMATION SOURCE: USBR; EL PASO

NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

(Continued)

TABLE A4. RIO GRANDE FLOW AND WATER QUALITY AT EL PASO (CROUCHANE BRIDGE) FOR 1976

MONTH	FLOW AC-FT	CA MG/L	K MG/L	NA MG/L	HCO3 MG/L	CO3 MG/L	SO4 MG/L	NO3 MG/L	CL MG/L	TDS MG/L
1	15600.	107.	23.	258.	209.	410.	261.	0.	0.	1190.
2	14198.	111.	24.	285.	233.	445.	270.	0.	0.	1288.
3	40200.	109.	23.	269.	219.	425.	265.	0.	0.	1232.
4	50279.	85.	14.	99.	76.	210.	208.	0.	0.	630.
5	60697.	91.	16.	140.	111.	263.	222.	0.	0.	777.
6	50099.	120.	28.	352.	289.	528.	292.	0.	0.	1523.
7	47905.	93.	17.	153.	122.	279.	226.	0.	0.	822.
8	57382.	95.	18.	168.	134.	297.	231.	0.	0.	875.
9	31511.	121.	28.	360.	296.	538.	295.	0.	0.	1551.
10	14340.	109.	24.	272.	222.	428.	265.	0.	0.	1242.
11	10475.	115.	26.	312.	255.	478.	279.	0.	0.	1382.
12	9999.	114.	25.	305.	249.	469.	276.	0.	0.	1358.

INFORMATION SOURCE: USBR; EI PASO
NOTE: FIRST FOUR MONTHS ARE NOT REPORTED HERE.

TABLE A5. MESILLA VALLEY, INITIAL SOIL ANALYSIS

CONSTITUTENT	SOIL SEGMENT NO. 1	2	3	4	5	6	7	8
CA (MEQ/L)	10.0	10.4	20.7	32.0	32.6	22.9	17.6	15.9
MG (MEQ/L)	2.7	3.0	6.3	10.3	11.4	7.1	5.5	4.6
NA (MEQ/L)	11.4	13.1	20.2	30.2	38.4	27.6	22.3	20.3
CL (MEQ/L)	3.0	2.8	3.7	6.2	10.9	9.0	7.5	6.4
SO4 (MEQ/L)	9.8	12.7	33.6	56.8	59.9	38.9	29.4	26.1
HCO3 (MEQ/L)	11.0	10.4	9.0	8.1	8.0	7.4	6.9	6.7
CO3 (MEQ/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO3 (MEQ/L)	0.6	0.8	0.6	1.2	3.0	1.8	1.1	0.9
SOIL/WATER RATIO OF EXTRACT	0.7	0.7	0.8	0.7	0.4	0.4	0.3	0.3
VOLUME OF WATER IN SOIL SEG. (ML)	10.0	10.1	10.1	10.7	5.8	5.2	5.4	4.9
CATION EXC. CAP. (MEQ/100 GM)	20.0	20.0	20.0	20.0	5.0	5.0	5.0	5.0
GYPSUM (MEQ/100 GM)	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2
SOIL BULK DENSITY (GM/CC)	1.4	1.4	1.3	1.5	1.5	1.5	1.6	1.6
LENGTH OF SOIL SEG (CM)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

INFORMATION SOURCE: NMSU, LAS CRUCES

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 74622, CROPPED ACRES IN 1967

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	136.7	226.8	363.5	.00487	4843.	0.07506
FEB	77.2	128.1	205.3	.00275	1997.	0.10282
MAR	4243.7	7041.6	11285.3	.15123	67014.	0.16840
APR	5612.1	9312.0	14924.1	.20000	67014.	0.22270
MAY	7300.9	12114.3	19415.2	.26018	67014.	0.28972
JUN	10622.2	17625.4	28247.6	.37854	66606.	0.42410
JUL	10640.5	17655.6	28296.1	.37919	66606.	0.42483
AUG	3690.6	6123.8	9814.4	.13152	26303.	0.37313
SEP	2486.6	4125.9	6612.5	.08861	24203.	0.27321
OCT	2580.2	4281.2	6861.4	.09195	25611.	0.26791
NOV	888.9	1475.0	2364.0	.03168	16231.	0.14564
DEC	47.0	78.0	125.0	.00167	2846.	0.04391
TOTALS:			128514.3	1.72		2.81

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.19
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.72
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.81

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 82820, CROPPED ACRES IN 1968

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	80.4	133.5	213.9	.00258	6218.	0.03440
FEB	57.8	95.8	153.6	.00185	3022.	0.05083
MAR	1844.9	3061.3	4906.2	.05924	73478.	0.06677
APR	5077.9	8425.7	13503.6	.16305	73478.	0.18378
MAY	8770.7	14553.1	23323.8	.28162	73478.	0.31743
JUN	14469.3	24008.7	38478.0	.46460	71783.	0.53603
JUL	9475.8	15723.2	25199.0	.30426	71783.	0.35104
AUG	2538.7	4212.4	6751.0	.08151	27488.	0.24560
SEP	2522.2	4185.0	6707.2	.08098	25410.	0.26396
OCT	2451.2	4067.2	6518.4	.07871	27004.	0.24139
NOV	290.0	481.1	771.1	.00931	15565.	0.04954
DEC	75.3	124.9	200.2	.00242	3196.	0.06264
TOTALS:			126726.0	1.53		2.40

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.17
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.53
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.40

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 81497, CROPPED ACRES IN 1969

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	93.6	155.2	248.8	.00305	5432.	0.04580
FEB	85.3	141.5	226.8	.00278	2422.	0.09363
MAR	3758.5	6236.4	9994.8	.12264	72265.	0.13831
APR	6067.5	10067.8	16135.3	.19799	72265.	0.22328
MAY	7836.1	13002.4	20838.4	.25570	72265.	0.28836
JUN	12360.3	20509.4	32869.7	.40332	71952.	0.45683
JUL	7583.8	12583.6	20167.6	.24746	71952.	0.28029
AUG	4761.2	7900.3	12661.5	.15536	28301.	0.44739
SEP	2776.0	4606.2	7382.2	.09058	26641.	0.27710
OCT	1740.6	2888.1	4628.7	.05680	28144.	0.16446
NOV	1068.9	1773.6	2842.5	.03488	16508.	0.17219
DEC	0.0	0.0	0.0	.00000	3010.	0.00000
TOTALS:			127996.4	1.57		2.59

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.18
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.57
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.59

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 83619, CROPPED ACRES IN 1970

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	144.1	239.0	383.1	.00458	5008.	0.07650
FEB	56.1	93.0	149.1	.00178	1904.	0.07832
MAR	3202.9	5314.6	8517.5	.10186	75481.	0.11284
APR	5846.5	9701.1	15547.6	.18593	75481.	0.20598
MAY	8943.8	14840.4	23784.2	.28444	75481.	0.31510
JUN	14494.7	24051.0	38545.7	.46097	75526.	0.51036
JUL	14133.0	23450.8	37583.8	.44946	75526.	0.49763
AUG	5581.5	9261.4	14842.9	.17751	30562.	0.48567
SEP	3685.5	6115.3	9800.7	.11721	28075.	0.34909
OCT	2649.6	4396.5	7046.1	.08426	29627.	0.23783
NOV	1300.2	2157.4	3457.6	.04135	18708.	0.18482
DEC	108.9	180.8	289.7	.00346	3104.	0.09334
TOTALS:			159948.0	1.91		3.15

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.48
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.91
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 3.15

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 81091, CROPPED ACRES IN 1971

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	105.0	174.3	279.3	.00344	3902.	0.07158
FEB	54.4	90.3	144.7	.00178	1322.	0.10943
MAR	4627.1	7677.7	12304.9	.15174	74665.	0.16480
APR	5607.6	9304.7	14912.3	.18390	74665.	0.19972
MAY	8880.7	14735.6	23616.3	.29123	74665.	0.31630
JUN	15280.1	25354.2	40634.3	.50110	75233.	0.54011
JUL	12255.3	20335.1	32590.5	.40190	75233.	0.43319
AUG	5365.4	8902.7	14268.1	.17595	29786.	0.47902
SEP	3494.9	5799.0	9293.9	.11461	27233.	0.34127
OCT	1733.7	2876.7	4610.4	.05685	28522.	0.16164
NOV	1100.5	1826.0	2926.5	.03609	18701.	0.15649
DEC	50.2	83.3	133.5	.00165	2580.	0.05176
TOTALS:			155714.6	1.92		3.03

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.44
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.92
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 3.03

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 78575, CROPPED ACRES IN 1972

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	89.8	149.0	238.7	.00304	3995.	0.05976
FEB	60.4	100.2	160.6	.00204	1419.	0.11315
MAR	4924.0	8170.4	13094.4	.16665	73030.	0.17930
APR	6048.3	10035.9	16084.2	.20470	73030.	0.22024
MAY	8546.8	14181.6	22728.4	.28926	73030.	0.31122
JUN	10957.4	18181.5	29138.9	.37084	72561.	0.40158
JUL	12753.1	21161.1	33914.3	.43162	72561.	0.46739
AUG	3323.6	5514.8	8838.4	.11248	28013.	0.31551
SEP	2585.1	4289.4	6874.1	.08749	26088.	0.26351
OCT	521.8	865.9	1387.7	.01766	27376.	0.05069
NOV	1039.9	1725.6	2765.5	.03520	18263.	0.15143
DEC	46.6	77.3	123.9	.00158	2576.	0.04809
TOTALS:			135349.4	1.72		2.58

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.25
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.72
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.58

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 82787, CROPPED ACRES IN 1973

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	0.0	0.0	0.0	.00000	4671.	0.00000
FEB	2.6	4.4	7.0	.00008	1491.	0.00469
MAR	3696.3	6133.2	9829.4	.11873	75338.	0.13047
APR	5747.3	9536.4	15283.7	.18461	75338.	0.20287
MAY	8158.3	13537.1	21695.4	.26206	75338.	0.28797
JUN	12273.3	20365.0	32638.3	.39424	75871.	0.43018
JUL	7572.5	12565.0	20137.6	.24325	75871.	0.26542
AUG	5893.4	9778.9	15672.3	.18931	32096.	0.48829
SEP	4182.9	6940.6	11123.4	.13436	29824.	0.37297
OCT	3058.0	5074.1	8132.1	.09823	31390.	0.25907
NOV	1473.2	2444.5	3917.7	.04732	20504.	0.19107
DEC	122.0	202.4	324.3	.00392	3180.	0.10199
TOTALS:			138761.3	1.68		2.73

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.28
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.68
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.73

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 81963, CROPPED ACRES IN 1974

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	38.7	64.2	102.8	.00125	3498.	0.02940
FEB	43.0	71.3	114.3	.00139	1118.	0.10223
MAR	4050.3	6720.7	10771.0	.13141	76836.	0.14018
APR	6136.2	10181.7	16318.0	.19909	76836.	0.21237
MAY	9433.2	15652.5	25085.7	.30606	76836.	0.32648
JUN	15724.5	26091.5	41816.1	.51018	76868.	0.54400
JUL	8954.7	14856.5	23813.2	.29054	76868.	0.30979
AUG	3145.5	5219.4	8364.9	.10206	28320.	0.29537
SEP	1403.9	2329.4	3733.3	.04555	26933.	0.13861
OCT	1221.6	2027.0	3248.7	.03964	28038.	0.11587
NOV	1108.7	1639.7	2948.4	.03597	18544.	0.15900
DEC	29.8	49.4	79.2	.00097	2380.	0.03328
TOTALS:			136395.6	1.66		2.41

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.26
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.66
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.41

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 80796, CROPPED ACRES IN 1975

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	203.7	338.0	541.8	.00671	14867.	0.03644
FEB	366.4	607.9	974.3	.01206	12733.	0.07651
MAR	3967.6	6583.3	10550.9	.13059	74231.	0.14214
APR	5754.9	9549.1	15304.0	.18942	74231.	0.20617
MAY	7893.2	13097.1	20990.3	.25979	74231.	0.28277
JUN	12692.1	21059.9	33752.1	.41774	63953.	0.52776
JUL	11901.0	19747.2	31648.1	.39170	63953.	0.49487
AUG	4489.1	7448.7	11937.8	.14775	32757.	0.36443
SEP	2682.4	4450.9	7133.3	.08829	31950.	0.22327
OCT	2303.6	3822.3	6125.9	.07582	32482.	0.18859
NOV	1077.9	1788.6	2866.5	.03548	17168.	0.16697
DEC	55.9	92.8	148.7	.00184	2134.	0.06968
TOTALS:			141973.6	1.76		2.78

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.31
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.76
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.78

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

(Continued)

TABLE A6. BLANEY-CRIDDLE CONSUMPTIVE USE FOR 79558, CROPPED ACRES IN 1976

MONTH	NODE 1 (AC-FT/MO)	NODE 2 (AC-FT/MO)	TOTAL FOR VALLEY (AC-FT/MO)	TOTAL FOR VALLEY (FT/MO)	TOTAL CROPPED ACRES	TOTAL ET PER ACRE (FT/MO)
JAN	132.9	220.5	353.3	.00444	7193.	0.04912
FEB	165.6	274.7	440.3	.00553	4925.	0.08940
MAR	4261.9	7071.7	11333.6	.14246	73406.	0.15440
APR	4761.6	7900.9	12662.6	.15916	73406.	0.17250
MAY	8123.4	13479.2	21602.6	.27153	73406.	0.29429
JUN	12210.4	20260.5	32471.0	.40814	70401.	0.46123
JUL	10937.8	18149.0	29086.8	.36561	70401.	0.41316
AUG	6008.1	9969.1	15977.2	.20082	29934.	0.53375
SEP	2783.7	4619.0	7402.7	.09305	29142.	0.25402
OCT	1847.8	3066.1	4913.9	.06176	30410.	0.16159
NOV	541.2	898.0	1439.2	.01809	15108.	0.09526
DEC	76.9	127.6	204.6	.00257	2268.	0.09019
TOTALS:			137887.7	1.73		2.77

ET (FT/YR) BASED ON ENTIRE VALLEY ACREAGE = 1.27
ET (FT/YR) BASED ON YEARLY CROPPED ACREAGE = 1.73
ET (FT/YR) BASED ON MONTHLY CROPPED ACREAGE = 2.77

SOME AREAS PRODUCE MULTIPLE YEARLY CROPS

TABLE A-7. WELL NUMBERING SYSTEM, ELEVATIONS, LOCATIONS, AND THEISSEN WEIGHTING FACTORS.

WELL NO.	ELEV	LOCATION	W1	W2	WT
26	3928.52	22S.1E.09.241	0.03142	0.00000	0.01190
20	3926.59	22S.1E.09.333	0.07481	0.00000	0.02833
19	3921.84	22S.1E.16.433	0.07494	0.00000	0.02838
15	3904.81	22S.1E.33.341	0.03753	0.00000	0.01421
18	3908.35	22S.1E.35.343	0.11945	0.00000	0.04524
17	3908.21	22S.1E.35.434	0.15349	0.00000	0.05813
16	3893.13	23S.1E.16.211	0.03067	0.00000	0.01162
12	3894.19	23S.1E.16.424	0.03741	0.00000	0.01483
11	3880.79	23S.1E.27.334	0.03915	0.00000	0.01417
13	3861.36	24S.2E.08.434	0.24889	0.01809	0.10548
14	3860.40	24S.2E.09.433	0.04214	0.00258	0.01757
10	3849.85	24S.2E.23.133	0.03317	0.00813	0.01761
9	3847.08	24S.2E.23.342	0.02456	0.01482	0.01851
8	3849.00	24S.2E.28.331	0.00000	0.04036	0.02507
25	3833.74	25S.2E.01.411	0.00000	0.05837	0.03626
7	3845.47	25S.2E.04.114	0.00000	0.04362	0.02710
6	3827.05	25S.2E.23.212	0.00000	0.06506	0.04042
5	3819.78	25S.2E.25.322	0.00000	0.04058	0.02521
24	3817.41	25S.3E.20.321	0.00000	0.03359	0.02087
4	3812.76	25S.3E.31.321	0.00000	0.02668	0.01657
27	3813.06	25S.3E.33.121	0.00000	0.01360	0.00845
21	3808.98	26S.3E.04.122	0.00000	0.01269	0.00789
23	3807.50	26S.3E.08.211	0.00000	0.01968	0.01223
22	3803.18	26S.3E.09.212	0.00000	0.01216	0.00756
3	3811.01	26S.3E.06.211	0.00000	0.05282	0.03282
28	3804.95	26S.3E.15.112	0.00000	0.01991	0.01237
32	3793.08	26S.3E.22.344	0.00000	0.02690	0.01672
31	3791.35	26S.3E.22.443	0.00000	0.00988	0.00614
30	3792.96	26S.3E.22.212	0.00000	0.01064	0.00661
39	3788.53	26S.3E.32.441	0.00000	0.08513	0.05288
29	3786.84	27S.3E.02.112	0.00000	0.03618	0.02248
38	3777.54	27S.3E.09.444	0.00000	0.07889	0.04900
1	3769.70	27S.3E.28.314	0.00000	0.06528	0.04056
2	3771.68	27S.3E.32.231	0.00000	0.01778	0.01105
37	3753.92	28S.3E.11.311	0.00000	0.04385	0.02725
36	3753.15	28S.3E.15.222	0.00000	0.05434	0.03376
35	3746.57	28S.3E.26.244	0.00000	0.02440	0.01516
33	3745.79	28S.3E.24.223	0.00000	0.02538	0.01577
34	3733.97	29S.4E.06.243	0.00000	0.03861	0.02399

THE ELEVATION IS IN FEET ABOVE MEAN SEA LEVEL (USC&G DATUM).
THE LOCATION IS GIVEN USING THE USGS SYSTEM.
W1 IS THE THEISSEN POLYGON WEIGHT FACTOR FOR NODE 1
W2 IS THE THEISSEN POLYGON WEIGHT FACTOR FOR NODE 2
WT IS THE THEISSEN POLYGON WEIGHT FACTOR FOR THE ENTIRE MESILLA VALLEY

USE THESE FACTORS TO CALCULATE AVERAGE WATER LEVELS.

TABLE A8.

MESILLA VALLEY WATER LEVELS FOR 1946, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3919.82	3919.32	3919.12	3920.02	3920.42	3921.32	3922.17	3922.92	3922.12	3921.32	3920.62	3919.92
20	3919.69	3919.79	3919.59	3921.19	3921.39	3921.39	3922.19	3922.19	3921.69	3920.49	3919.99	3919.49
19	3914.74	3914.34	3915.54	3916.24	3916.34	3917.04	3916.94	3916.24	3915.54	3914.94	3914.44	3914.04
15	3897.81	3897.81	3897.91	3898.91	3898.81	3898.91	3899.41	3899.31	3898.51	3898.51	3896.01	3897.71
18	3898.35	3897.95	3898.05	3898.35	3898.58	3899.25	3899.75	3900.05	3898.95	3898.35	3898.35	3898.15
17	3897.51	3897.01	3897.11	3898.61	3898.91	3899.41	3900.11	3900.21	3899.71	3898.41	3897.71	3897.11
16	3885.73	3885.63	3885.53	3885.51	3885.51	3885.43	3885.53	3885.53	3885.63	3885.63	3885.63	3885.53
12	3881.89	3881.69	3881.79	3882.49	3882.39	3882.99	3882.79	3882.89	3882.49	3882.09	3881.89	3881.69
11	3874.49	3874.89	3875.39	3875.99	3875.79	3876.59	3876.49	3876.19	3875.09	3874.79	3874.79	3874.59
13	3852.96	3852.56	3852.76	3853.66	3854.36	3855.36	3856.26	3856.36	3855.58	3854.58	3853.88	3853.48
14	3852.00	3851.90	3851.90	3852.80	3853.20	3853.40	3853.40	3854.20	3853.30	3852.80	3852.20	3851.90
10	3842.15	3841.85	3841.55	3842.45	3842.65	3842.95	3843.65	3843.95	3843.35	3842.75	3842.45	3841.95
9	3839.58	3839.48	3839.48	3839.39	3839.38	3839.38	3839.38	3839.48	3839.48	3839.48	3839.48	3839.38
8	3838.60	3838.70	3839.30	3840.30	3840.50	3841.00	3841.60	3841.40	3841.20	3839.40	3839.60	3838.90
25	3825.84	3825.64	3826.04	3827.54	3828.64	3828.84	3829.84	3829.74	3828.34	3826.94	3826.49	3825.94
7	3834.27	3834.17	3834.47	3834.97	3835.37	3835.87	3836.17	3836.17	3836.07	3835.17	3834.87	3834.37
6	3818.25	3818.15	3818.15	3818.95	3819.65	3820.05	3820.25	3820.55	3819.85	3819.25	3816.85	3818.25
5	3809.88	3809.88	3811.08	3811.28	3811.58	3811.48	3812.18	3811.98	3810.98	3810.48	3810.18	3809.98
24	3811.01	3811.21	3811.71	3812.51	3812.91	3812.91	3813.11	3813.21	3812.81	3811.71	3811.51	3811.21
4	3805.76	3805.16	3805.66	3806.16	3806.46	3805.76	3807.26	3807.36	3806.66	3806.18	3805.88	3805.46
27	3804.76	3804.76	3805.66	3807.16	3807.76	3808.06	3808.46	3808.66	3808.28	3805.55	3805.18	3804.96
21	3801.08	3800.98	3801.38	3801.68	3802.28	3802.38	3802.88	3803.18	3802.78	3801.78	3801.48	3801.08
23	3799.40	3799.00	3801.80	3802.10	3801.60	3803.40	3802.90	3802.80	3801.70	3800.50	3800.30	3799.30
22	3795.68	3795.68	3795.98	3797.38	3798.08	3798.38	3798.48	3798.78	3797.36	3796.58	3796.18	3795.78
3	3803.71	3803.11	3803.21	3803.71	3803.81	3804.11	3804.21	3804.31	3803.81	3803.41	3803.21	3803.21
28	3796.45	3796.75	3797.05	3798.25	3798.75	3798.95	3798.95	3799.05	3799.25	3797.35	3797.15	3796.95
32	3786.68	3786.98	3787.38	3789.08	3788.78	3789.38	3789.38	3789.88	3788.48	3787.38	3786.98	3786.58
31	3785.85	3786.25	3786.45	3787.75	3787.85	3787.95	3788.15	3788.55	3788.05	3786.35	3786.05	3785.75
30	3786.56	3786.26	3788.46	3789.26	3788.56	3787.56	3787.66	3787.56	3787.36	3787.46	3787.28	3787.18
39	3781.33	3781.33	3781.73	3783.13	3782.93	3783.73	3784.03	3783.93	3783.03	3781.93	3781.73	3781.43
29	3781.24	3781.24	3782.14	3783.24	3782.34	3782.84	3782.64	3782.74	3782.54	3781.34	3781.14	3781.04
38	3773.74	3773.84	3772.24	3774.54	3774.14	3775.44	3775.24	3775.54	3774.54	3773.24	3772.64	3772.14
1	3759.40	3759.60	3760.20	3760.60	3760.70	3761.20	3761.50	3761.20	3760.10	3759.80	3759.80	3759.50
2	3763.48	3763.28	3763.28	3764.20	3764.18	3764.78	3765.38	3765.48	3764.78	3764.18	3763.78	3763.38
37	3747.62	3747.62	3748.02	3748.72	3748.62	3748.62	3748.92	3749.02	3748.52	3748.02	3737.92	3747.92
36	3746.45	3746.35	3746.65	3748.55	3748.45	3748.85	3749.25	3749.15	3747.75	3746.95	3746.75	3746.35
35	3740.27	3740.57	3741.47	3741.67	3741.77	3741.87	3741.97	3741.87	3740.77	3740.27	3740.57	3740.37
33	3737.49	3737.79	3738.09	3739.19	3739.59	3739.69	3739.39	3738.89	3738.09	3737.59	3737.59	3737.49
34	3728.47	3728.77	3728.97	3730.27	3730.47	3730.77	3730.37	3730.27	3729.47	3728.87	3728.67	3728.57
VALLEY MEAN...	3826,23	3826,13	3826,30	3827,35	3827,54	3828,01	3828,37	3828,42	3827,68	3826,85	3826,53	3826,17
NODE 1 MEAN...	3886,43	3886,16	3886,32	3887,16	3887,45	3888,01	3888,52	3888,60	3887,93	3887,18	3886,75	3886,38
NODE 2 MEAN...	3789,51	3789,51	3789,83	3790,87	3791,00	3791,42	3791,69	3791,73	3790,94	3790,06	3789,80	3789,45

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1947. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3919.42	3919.02	3918.82	3920.02	3920.22	3920.82	3921.92	3921.97	3921.02	3921.32	3919.62	3919.12
20	3919.29	3919.09	3919.29	3921.09	3921.29	3921.79	3921.79	3921.79	3920.09	3919.29	3918.89	3918.79
19	3913.74	3913.54	3914.14	3915.04	3915.54	3916.04	3916.74	3916.64	3914.84	3914.24	3913.64	3913.34
15	3897.71	3897.61	3897.81	3898.71	3898.91	3898.71	3899.01	3898.91	3898.31	3897.91	3897.81	3897.71
18	3898.05	3897.75	3897.95	3898.15	3898.45	3898.85	3900.05	3899.75	3899.05	3898.45	3898.35	3898.35
17	3897.01	3896.81	3896.91	3897.81	3898.31	3898.81	3899.51	3899.51	3898.91	3898.21	3897.71	3898.01
16	3885.43	3885.43	3885.33	3885.33	3885.33	3885.33	3885.43	3885.43	3885.53	3885.53	3885.23	3885.23
12	3881.59	3881.39	3881.69	3882.29	3882.39	3881.99	3881.89	3881.49	3881.19	3880.99	3880.69	3880.39
11	3874.49	3874.59	3875.39	3875.69	3875.19	3876.09	3876.09	3875.49	3874.49	3874.49	3874.39	3874.39
13	3852.86	3852.66	3852.46	3853.76	3854.66	3855.26	3855.56	3856.06	3855.76	3855.16	3854.46	3853.76
14	3851.70	3851.60	3851.30	3852.60	3853.10	3853.40	3853.80	3854.20	3853.30	3852.70	3852.50	3852.20
10	3841.85	3841.65	3841.55	3842.55	3842.55	3842.65	3843.35	3843.35	3843.15	3842.75	3842.35	3842.15
9	3839.38	3839.38	3839.38	3839.28	3839.28	3839.28	3840.28	3840.28	3840.38	3840.28	3840.38	3840.18
8	3838.60	3838.60	3839.90	3840.90	3841.30	3841.80	3841.60	3841.50	3841.00	3840.80	3839.50	3838.90
25	3825.34	3825.44	3825.84	3827.34	3828.14	3828.84	3830.14	3829.84	3829.44	3826.44	3825.54	3825.44
7	3834.27	3834.37	3834.47	3835.37	3836.07	3836.17	3836.57	3836.37	3836.17	3835.27	3834.67	3834.37
6	3818.15	3818.15	3818.25	3819.05	3819.25	3820.05	3820.45	3820.65	3820.55	3819.65	3818.95	3818.55
5	3810.08	3810.08	3810.28	3811.38	3811.48	3811.48	3812.18	3811.98	3811.74	3810.78	3810.38	3810.18
24	3811.01	3811.01	3811.51	3812.41	3812.61	3812.71	3812.91	3813.31	3812.81	3811.41	3811.11	3811.01
4	3805.26	3805.36	3804.35	3806.26	3806.86	3805.76	3807.36	3807.36	3807.06	3806.26	3805.86	3805.76
27	3804.76	3804.86	3805.86	3806.96	3807.66	3808.66	3808.36	3808.16	3807.96	3805.56	3804.96	3804.76
21	3801.08	3801.08	3801.38	3802.18	3801.88	3802.08	3802.78	3802.78	3802.58	3801.68	3801.39	3801.18
23	3798.60	3799.00	3800.00	3801.50	3803.30	3801.50	3803.30	3801.60	3801.50	3798.40	3798.90	3798.80
22	3795.48	3795.48	3795.58	3797.08	3797.68	3796.98	3798.48	3798.08	3797.58	3796.38	3795.88	3795.78
3	3803.11	3803.11	3803.11	3803.91	3804.01	3804.21	3804.41	3804.41	3804.21	3803.51	3803.31	3803.21
28	3796.85	3796.85	3797.35	3798.45	3798.55	3798.35	3798.55	3798.55	3798.45	3797.05	3796.95	3796.85
32	3786.38	3786.38	3786.88	3788.48	3788.58	3788.38	3789.28	3789.08	3788.58	3787.18	3786.78	3786.58
31	3785.75	3785.65	3786.35	3787.05	3787.05	3786.95	3788.15	3787.75	3787.55	3786.15	3785.85	3785.75
30	3786.96	3786.96	3786.66	3786.96	3787.36	3786.96	3789.36	3789.76	3788.36	3786.75	3786.16	3785.86
39	3781.23	3781.03	3781.63	3782.93	3783.23	3783.63	3784.03	3784.13	3783.03	3781.93	3781.53	3781.33
29	3781.04	3781.14	3781.94	3782.44	3782.64	3782.64	3782.94	3782.34	3782.24	3781.04	3780.94	3780.94
38	3771.84	3771.84	3772.24	3774.14	3774.44	3775.14	3775.44	3775.74	3775.24	3773.54	3772.34	3772.14
1	3759.10	3759.40	3760.20	3760.90	3760.90	3761.00	3761.50	3761.10	3760.60	3759.80	3759.60	3759.50
2	3763.18	3762.98	3763.08	3763.78	3764.08	3764.28	3764.78	3765.49	3764.98	3764.08	3763.58	3763.28
37	3747.82	3747.82	3747.92	3748.82	3748.62	3749.82	3749.22	3750.42	3748.92	3748.22	3746.12	3748.02
36	3746.35	3746.25	3746.45	3747.85	3748.15	3748.75	3749.65	3749.75	3748.65	3746.95	3746.65	3746.45
35	3740.27	3740.47	3741.27	3741.57	3741.37	3741.87	3741.87	3741.87	3740.77	3740.07	3740.07	3740.07
33	3737.39	3737.29	3738.39	3738.69	3738.89	3738.99	3739.19	3738.69	3738.19	3737.49	3737.39	3737.39
34	3728.47	3728.37	3728.87	3730.67	3730.27	3730.17	3730.77	3730.17	3730.17	3728.97	3728.77	3728.67
VALLEY MEAN...	3825.96	3825.89	3826.18	3827.18	3827.50	3827.81	3828.33	3828.37	3827.77	3826.85	3826.39	3826.19
NODE 1 MEAN...	3886.13	3885.95	3886.02	3886.90	3887.31	3887.71	3888.20	3888.25	3887.60	3887.11	3886.67	3886.46
NODE 2 MEAN...	3789.26	3789.27	3789.69	3790.76	3791.03	3791.28	3791.82	3791.77	3791.28	3790.10	3789.62	3789.43

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1948. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.62	3918.32	3918.22	3918.72	3919.22	3919.62	3920.22	3921.02	3920.92	3920.22	3919.62	3919.22
20	3918.59	3918.49	3918.49	3919.59	3920.29	3920.49	3921.69	3921.89	3921.59	3920.49	3919.79	3919.29
19	3913.04	3912.64	3912.74	3913.74	3914.04	3914.74	3915.24	3915.74	3915.34	3914.64	3915.14	3913.84
15	3897.31	3897.41	3897.41	3898.61	3898.51	3898.41	3898.81	3899.01	3898.61	3897.91	3897.71	3897.71
18	3898.35	3898.35	3898.35	3898.35	3898.35	3898.35	3899.35	3899.95	3899.25	3898.45	3898.35	3898.35
17	3897.01	3897.01	3897.01	3897.51	3897.91	3898.01	3899.01	3899.61	3899.21	3898.21	3897.91	3897.51
16	3885.13	3885.13	3885.03	3885.03	3885.03	3885.03	3885.03	3885.03	3885.03	3885.13	3885.13	3885.03
12	3880.39	3880.19	3880.19	3880.79	3881.09	3881.29	3881.59	3881.99	3881.89	3881.19	3880.69	3880.69
11	3874.19	3874.19	3874.19	3875.29	3875.19	3875.69	3876.19	3875.39	3875.09	3874.29	3874.29	3874.29
13	3852.96	3852.46	3852.16	3852.86	3853.86	3854.36	3855.96	3856.66	3856.36	3854.86	3854.26	3853.66
14	3851.70	3851.50	3851.40	3851.70	3852.40	3852.70	3853.30	3854.40	3853.80	3852.70	3852.30	3852.00
10	3841.85	3841.65	3841.65	3841.95	3842.35	3842.25	3842.85	3843.45	3843.65	3842.85	3842.65	3842.35
9	3840.18	3840.18	3840.18	3840.18	3840.18	3840.18	3840.18	3840.18	3840.18	3840.28	3840.28	3840.18
8	3838.70	3838.60	3838.50	3839.00	3839.30	3839.70	3840.30	3840.30	3840.30	3840.20	3838.50	3838.30
25	3825.34	3825.74	3826.14	3827.14	3828.44	3828.94	3829.94	3829.84	3828.44	3827.14	3826.54	3826.04
7	3834.27	3834.27	3834.27	3834.47	3834.87	3835.17	3835.47	3835.67	3834.97	3834.77	3834.27	3834.27
6	3818.15	3818.15	3818.15	3818.65	3818.95	3819.25	3819.65	3819.65	3819.65	3819.35	3818.35	3818.25
5	3809.98	3809.88	3809.78	3811.48	3811.28	3810.98	3811.59	3811.78	3811.18	3810.68	3810.08	3809.86
24	3810.91	3810.81	3810.71	3812.91	3813.11	3813.21	3813.11	3813.11	3812.61	3812.01	3811.71	3811.61
4	3805.56	3805.56	3805.46	3806.26	3806.96	3806.36	3806.56	3806.66	3806.56	3806.06	3806.06	3804.76
27	3804.66	3804.66	3804.56	3807.46	3807.86	3808.16	3808.26	3808.36	3807.26	3806.06	3805.46	3805.16
21	3801.08	3801.08	3801.08	3801.98	3802.08	3802.18	3802.69	3802.88	3802.48	3801.88	3801.58	3801.38
23	3798.50	3798.50	3798.60	3801.90	3802.36	3802.70	3803.20	3803.00	3801.3[illegible]	3800.90	3799.60	3800.00
22	3795.40	3795.38	3795.28	3796.68	3797.18	3797.68	3797.88	3798.08	3797.38	3796.58	3795.98	3795.56
3	3803.11	3803.11	3803.11	3803.91	3804.11	3803.31	3803.41	3803.51	3803.21	3803.21	3803.11	3803.11
28	3796.65	3796.65	3796.65	3798.05	3798.55	3798.95	3798.75	3799.05	3798.55	3798.55	3798.45	3798.45
32	3786.28	3786.18	3786.08	3787.98	3788.08	3788.08	3789.28	3789.18	3788.46	3787.48	3787.18	3788.88
31	3785.75	3785.75	3785.75	3787.05	3787.05	3787.15	3788.05	3788.15	3787.35	3786.55	3786.25	3786.05
30	3785.76	3785.76	3785.76	3786.86	3786.86	3786.76	3787.76	3787.86	3787.36	3786.56	3786.16	3786.06
39	3780.63	3780.73	3780.83	3783.03	3783.13	3783.23	3782.93	3782.93	3781.83	3781.03	3781.03	3780.73
29	3780.84	3780.84	3780.84	3782.54	3782.44	3782.14	3783.54	3783.44	3782.04	3781.24	3781.04	3780.44
38	3771.84	3771.84	3771.74	3772.74	3774.34	3774.74	3775.94	3775.74	3775.34	3774.74	3774.04	3772.94
1	3759.30	3759.30	3759.20	3760.50	3760.80	3761.10	3761.50	3761.30	3760.90	3760.20	3760.10	3760.00
2	3763.08	3762.48	3761.88	3763.58	3763.68	3763.88	3764.98	3765.38	3764.88	3764.18	3763.78	3763.48
37	3747.92	3747.92	3747.82	3749.02	3749.22	3749.42	3750.32	3750.02	3749.22	3746.72	3748.52	3748.42
36	3746.25	3746.25	3746.25	3747.95	3748.75	3749.15	3750.05	3749.95	3748.65	3747.35	3746.95	3746.75
35	3740.07	3740.07	3739.97	3741.67	3741.97	3742.17	3742.37	3741.97	3740.97	3740.47	3740.37	3740.37
33	3737.39	3737.39	3737.29	3739.59	3739.49	3739.39	3739.89	3739.99	3738.69	3737.99	3737.99	3737.39
34	3728.47	3728.47	3728.47	3730.37	3730.17	3729.97	3729.97	3730.17	3729.57	3728.97	3728.77	3728.67
VALLEY MEAN...	3825,87	3825,79	3825,75	3826,79	3827,21	3827,39	3828,06	3829,24	3827,70	3826,95	3826,58	3826,26
NODE 1 MEAN...	3886,00	3885,81	3885,73	3886,29	3886,73	3886,99	3887,89	3889,37	3888,04	3887,11	3886,83	3886,44
NODE 2 MEAN...	3789,20	3789,19	3789,17	3790,51	3790,92	3791,04	3791,57	3791,57	3790,89	3790,26	3789,84	3789,56

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1949, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.22	3918.22	3918.12	3919.12	3919.42	3919.92	3920.62	3921.82	3921.32	3920.32	3919.72	3919.22
20	3918.59	3918.59	3918.69	3920.09	3921.09	3921.19	3921.49	3921.19	3920.89	3920.09	3919.59	3919.19
19	3913.14	3913.14	3913.94	3914.54	3914.94	3915.04	3916.14	3916.04	3915.74	3914.94	3914.44	3914.04
15	3897.41	3897.41	3897.71	3898.61	3898.71	3899.11	3899.31	3899.61	3900.31	3898.51	3898.41	3898.11
18	3898.35	3898.35	3898.35	3898.35	3898.35	3898.65	3900.25	3900.65	3899.35	3898.35	3898.35	3898.35
17	3897.01	3897.01	3897.01	3898.41	3898.81	3898.81	3899.61	3899.91	3899.31	3898.51	3897.91	3897.51
16	3884.93	3884.93	3884.93	3884.93	3884.93	3884.93	3884.83	3885.33	3885.53	3885.33	3885.33	3885.23
12	3880.29	3880.29	3880.59	3881.05	3881.19	3881.34	3881.99	3882.09	3881.89	3881.29	3880.99	3880.69
11	3874.19	3874.19	3874.49	3875.09	3876.19	3875.90	3875.49	3875.79	3874.89	3874.29	3874.29	3874.19
13	3852.56	3852.46	3852.56	3854.06	3854.56	3854.96	3856.66	3856.66	3855.66	3855.06	3854.26	3853.66
14	3851.60	3851.60	3851.90	3852.60	3852.90	3853.30	3854.00	3854.60	3854.90	3852.90	3852.50	3852.20
10	3841.85	3841.85	3841.85	3842.75	3842.85	3842.95	3843.55	3844.05	3843.65	3843.25	3843.05	3842.75
9	3840.08	3840.08	3840.08	3840.08	3839.98	3839.98	3840.08	3840.08	3840.18	3840.08	3840.18	3840.08
8	3838.20	3837.50	3837.80	3838.90	3839.50	3839.50	3839.40	3839.40	3839.00	3838.10	3838.00	3837.50
25	3825.34	3825.34	3825.64	3827.64	3828.54	3828.64	3828.74	3829.14	3828.54	3826.94	3826.64	3826.34
7	3834.27	3834.27	3834.37	3834.87	3835.57	3835.37	3835.67	3835.37	3835.27	3835.07	3834.67	3834.37
6	3818.25	3818.75	3818.25	3818.45	3818.95	3819.35	3819.85	3820.05	3819.65	3819.05	3818.55	3818.25
5	3809.78	3809.78	3809.88	3810.88	3811.08	3811.18	3811.68	3811.68	3811.38	3810.48	3810.18	3809.88
24	3811.41	3811.31	3811.01	3813.11	3813.41	3813.41	3813.51	3813.41	3813.21	3812.01	3811.71	3811.41
4	3804.76	3804.76	3804.86	3805.66	3805.86	3805.86	3806.16	3806.36	3806.26	3805.66	3805.56	3805.46
27	3804.96	3804.86	3805.16	3807.16	3807.66	3807.96	3808.66	3808.66	3807.86	3806.16	3805.66	3805.36
21	3801.18	3801.18	3801.48	3801.98	3801.98	3802.28	3802.58	3803.38	3803.08	3801.78	3801.28	3801.26
23	3798.60	3798.60	3798.80	3800.20	3801.40	3802.30	3802.80	3803.40	3802.00	3800.30	3799.70	3799.00
22	3795.38	3795.18	3795.28	3797.08	3796.68	3797.18	3797.78	3797.58	3797.18	3796.28	3795.88	3795.58
3	3803.11	3803.11	3803.11	3803.11	3803.21	3803.21	3803.41	3803.41	3803.31	3803.21	3803.21	3803.21
28	3798.35	3798.15	3798.05	3798.05	3798.15	3798.55	3798.95	3799.55	3798.25	3797.45	3797.05	3796.95
32	3786.68	3786.58	3786.78	3789.08	3788.68	3789.08	3789.88	3789.58	3788.88	3787.98	3787.48	3787.08
31	3785.85	3785.75	3785.85	3787.75	3787.45	3787.75	3788.55	3788.25	3787.65	3786.75	3786.25	3786.05
30	3785.86	3785.86	3786.06	3786.86	3786.96	3787.16	3787.66	3787.56	3786.96	3786.36	3786.06	3785.86
39	3780.53	3780.83	3781.13	3781.93	3782.03	3782.33	3782.63	3782.63	3782.13	3780.93	3780.73	3780.73
29	3780.84	3780.74	3780.94	3782.54	3781.94	3782.44	3783.14	3783.54	3783.04	3782.14	3781.34	3781.34
38	3772.14	3771.94	3772.64	3773.04	3773.84	3773.34	3774.14	3774.44	3774.34	3774.24	3774.04	3773.44
1	3760.00	3759.80	3760.10	3760.70	3760.30	3760.80	3760.90	3760.90	3760.80	3760.70	3760.60	3760.50
2	3763.28	3763.28	3763.38	3763.78	3763.78	3764.08	3764.98	3764.78	3764.38	3763.98	3763.58	3763.06
37	3748.32	3748.32	3749.12	3749.52	3748.82	3748.67	3749.52	3748.72	3748.32	3747.82	3747.52	3747.62
36	3746.45	3746.45	3748.75	3748.55	3748.85	3748.65	3749.55	3749.15	3747.75	3746.75	3746.45	3746.45
35	3740.37	3740.27	3741.67	3741.87	3741.87	3742.47	3742.47	3741.77	3741.27	3740.37	3739.87	3739.77
33	3737.39	3737.79	3738.99	3739.79	3739.79	3739.99	3739.89	3739.99	3738.79	3737.49	3737.29	3737.29
34	3728.57	3728.47	3729.47	3730.17	3730.27	3730.07	3730.37	3730.07	3729.77	3728.97	3728.77	3728.57
VALLEY MEAN...	3825.90	3825.87	3826.18	3827.01	3827.28	3827.43	3828.06	3828.11	3827.63	3826.87	3826.52	3826.25
NODE 1 MEAN...	3885.88	3885.83	3885.99	3886.90	3887.26	3887.46	3888.38	3888.57	3888.00	3887.24	3886.82	3886.48
NODE 2 MEAN...	3789.32	3789.27	3789.70	3790.50	3790.70	3790.83	3791.28	3791.25	3790.80	3790.06	3789.75	3789.51

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1950, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.82	3918.42	3918.32	3919.22	3919.02	3920.42	3920.52	3921.12	3920.72	3920.12	3919.52	3919.12
20	3918.89	3918.99	3919.59	3920.79	3921.39	3920.99	3921.39	3922.29	3920.99	3920.39	3919.29	3918.89
19	3913.64	3913.34	3914.14	3914.94	3915.74	3915.44	3915.74	3915.84	3915.24	3914.24	3914.04	3913.74
15	3897.81	3897.71	3898.31	3899.01	3899.31	3899.21	3899.41	3899.51	3899.11	3898.61	3898.21	3897.81
18	3898.35	3898.35	3898.35	3898.45	3899.35	3899.75	3900.05	3900.75	3899.65	3898.45	3898.45	3898.35
17	3897.01	3897.01	3897.31	3898.51	3899.21	3899.51	3899.81	3900.11	3899.61	3898.71	3898.21	3897.81
16	3885.23	3885.23	3885.13	3885.13	3885.13	3885.13	3885.13	3885.13	3885.13	3885.33	3885.23	3885.23
12	3879.79	3880.29	3880.49	3880.99	3881.59	3881.99	3882.09	3882.29	3881.59	3881.49	3880.99	3880.69
11	3874.19	3874.19	3875.39	3875.29	3875.59	3875.49	3875.49	3875.69	3874.99	3874.29	3874.29	3874.29
13	3852.96	3852.66	3853.26	3854.36	3855.16	3855.36	3856.76	3856.46	3855.86	3854.76	3854.36	3853.96
14	3851.90	3851.80	3851.90	3852.60	3853.00	3852.80	3853.60	3853.80	3852.90	3853.00	3852.80	3852.40
10	3842.45	3842.25	3842.35	3843.25	3843.75	3844.25	3844.45	3844.45	3843.05	3843.35	3843.05	3842.95
9	3839.98	3839.98	3839.98	3839.98	3839.98	3839.98	3839.98	3840.08	3840.08	3840.18	3840.08	3840.08
8	3837.30	3837.40	3837.80	3838.90	3839.50	3839.70	3839.50	3839.10	3838.70	3838.10	3837.70	3837.40
25	3825.44	3825.34	3825.64	3827.94	3828.64	3829.04	3829.24	3829.64	3828.34	3826.64	3825.84	3825.44
7	3834.27	3834.27	3834.47	3834.97	3835.27	3835.67	3835.47	3835.57	3835.27	3834.67	3834.27	3834.27
6	3818.25	3818.25	3819.25	3818.75	3819.25	3819.75	3819.95	3820.35	3820.05	3819.25	3818.75	3818.25
5	3809.70	3809.78	3809.88	3810.88	3811.28	3811.38	3811.78	3812.18	3812.08	3811.28	3810.78	3810.28
24	3811.21	3811.11	3811.61	3813.21	3813.11	3813.51	3813.41	3813.31	3812.41	3811.11	3810.51	3810.31
4	3805.36	3805.26	3805.26	3805.26	3805.26	3805.26	3805.16	3805.26	3805.16	3805.16	3805.06	3805.16
27	3805.06	3804.86	3805.06	3807.56	3807.86	3809.06	3808.86	3808.56	3807.16	3806.16	3804.66	3804.26
21	3801.18	3801.18	3801.58	3802.18	3802.38	3802.38	3803.08	3802.58	3802.28	3801.56	3801.08	3801.08
23	3798.80	3798.60	3798.70	3801.90	3801.40	3802.30	3801.40	3801.70	3800.00	3798.90	3798.90	3798.70
22	3795.38	3795.28	3795.08	3797.58	3797.18	3797.28	3797.08	3797.28	3796.68	3795.88	3795.38	3795.08
3	3803.21	3803.21	3803.21	3803.21	3803.21	3803.21	3803.31	3803.41	3803.21	3803.21	3803.21	3803.21
28	3796.85	3796.65	3796.65	3798.55	3798.55	3799.15	3797.95	3797.85	3797.25	3796.75	3796.55	3796.45
32	3786.88	3786.68	3786.58	3787.68	3788.98	3790.18	3788.38	3789.18	3787.78	3786.98	3786.48	3786.28
31	3785.85	3785.75	3785.75	3787.95	3787.65	3788.85	3787.05	3786.95	3786.45	3785.85	3784.85	3785.85
30	3785.86	3785.86	3785.96	3787.56	3787.56	3787.66	3787.06	3787.06	3786.96	3785.96	3785.86	3785.86
39	3780.73	3780.73	3781.03	3781.73	3782.13	3782.33	3782.33	3782.43	3781.73	3780.93	3780.73	3780.73
29	3781.24	3781.14	3781.44	3782.14	3782.64	3782.24	3782.24	3783.34	3781.44	3780.84	3780.54	3780.44
38	3773.24	3773.04	3772.84	3773.44	3773.44	3773.74	3773.94	3774.14	3774.14	3773.94	3773.64	3773.34
1	3760.50	3760.40	3760.50	3760.50	3760.60	3760.70	3760.50	3760.80	3760.40	3759.90	3759.60	3759.60
2	3762.98	3762.98	3763.28	3763.38	3763.68	3763.78	3764.38	3764.28	3764.08	3763.48	3763.08	3762.98
37	3747.62	3747.62	3748.02	3748.12	3748.32	3748.32	3748.42	3748.32	3748.32	3747.62	3747.72	3746.72
36	3746.45	3746.45	3746.75	3746.85	3747.65	3747.75	3748.95	3749.35	3747.65	3746.65	3746.35	3746.35
35	3739.77	3739.77	3740.07	3741.07	3741.77	3741.77	3741.77	3742.37	3740.57	3739.87	3739.47	3739.67
33	3737.29	3737.29	3737.39	3737.49	3737.69	3737.79	3737.29	3737.59	3737.29	3737.29	3737.29	3737.29
34	3728.47	3728.47	3729.17	3730.07	3729.77	3729.57	3729.67	3729.77	3729.67	3729.37	3728.97	3728.77
VALLEY MEAN...	3826,02	3825,95	3826,21	3826,99	3827,41	3827,60	3827,81	3828,00	3827,38	3826,69	3826,33	3826,11
NODE 1 MEAN...	3886,09	3886,00	3886,37	3887,12	3887,73	3887,86	3888,40	3888,50	3887,95	3887,19	3886,64	3886,56
NODE 2 MEAN...	3789,39	3789,33	3789,51	3790,32	3790,62	3790,84	3790,86	3791,06	3790,44	3789,79	3789,43	3789,25

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1951. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.32	3918.22	3918.12	3918.62	3918.12	3918.02	3918.32	3918.62	3918.32	3918.32	3918.32	3917.32
20	3918.59	3918.59	3919.50	3919.09	3919.49	3919.56	3919.59	3920.69	3919.69	3918.89	3919.09	3918.59
19	3913.44	3913.14	3912.64	3913.64	3913.54	3913.94	3913.94	3914.04	3913.54	3913.54	3913.54	3913.34
15	3897.51	3897.51	3897.41	3898.21	3897.61	3897.91	3898.01	3897.91	3897.81	3897.71	3897.61	3896.11
18	3898.35	3898.35	3898.35	3898.55	3898.35	3898.65	3898.65	3898.65	3898.65	3898.55	3896.55	3895.95
17	3897.11	3897.21	3897.01	3897.31	3897.91	3897.21	3897.21	3897.21	3897.31	3897.21	3897.41	3896.31
16	3885.13	3885.13	3885.03	3884.83	3884.73	3884.93	3884.73	3884.83	3884.83	3884.73	3884.73	3883.03
12	3880.49	3880.39	3880.39	3880.69	3879.89	3878.99	3879.09	3880.49	3880.69	3880.39	3880.29	3880.19
11	3874.19	3874.19	3874.19	3874.99	3874.29	3874.79	3875.29	3875.49	3874.69	3874.49	3876.49	3872.79
13	3853.26	3853.16	3853.06	3854.06	3853.26	3852.86	3852.96	3852.86	3853.26	3852.56	3852.56	3851.56
14	3852.10	3852.10	3852.60	3852.00	3851.90	3852.10	3852.20	3851.60	3851.60	3851.30	3851.20	3851.60
10	3842.65	3842.55	3842.45	3842.45	3841.85	3841.95	3841.95	3842.15	3841.85	3841.85	3841.85	3841.15
9	3840.08	3839.98	3839.88	3839.88	3839.88	3839.38	3839.78	3839.78	3839.66	3839.48	3839.38	3837.48
8	3837.20	3837.20	3837.50	3838.20	3838.20	3838.60	3838.70	3839.10	3838.50	3838.10	3837.60	3837.60
25	3825.34	3825.34	3825.34	3825.94	3825.34	3826.24	3826.84	3825.44	3825.54	3825.44	3825.44	3821.64
7	3834.27	3834.27	3834.37	3834.47	3834.47	3834.57	3834.77	3834.77	3834.57	3834.47	3834.47	3833.07
6	3818.25	3818.35	3818.35	3818.45	3817.45	3818.45	3818.55	3818.45	3818.45	3818.55	3818.45	3817.15
5	3810.08	3809.78	3809.78	3810.48	3809.78	3809.88	3809.78	3811.68	3809.78	3809.78	3809.68	3804.28
24	3810.31	3810.31	3810.41	3811.21	3810.91	3811.01	3811.11	3810.71	3810.91	3810.21	3810.01	3810.61
4	3805.06	3805.06	3805.06	3805.16	3805.06	3805.16	3805.26	3805.16	3805.16	3805.16	3805.06	3803.66
27	3804.16	3804.06	3804.96	3806.06	3805.26	3805.96	3806.86	3807.76	3805.66	3804.26	3803.96	3803.86
21	3801.08	3801.08	3801.08	3801.38	3801.08	3801.28	3801.28	3801.78	3801.28	3801.28	3801.18	3800.58
23	3798.60	3798.60	3799.30	3801.30	3799.60	3800.30	3799.90	3800.40	3799.20	3799.20	3799.20	3796.40
22	3794.88	3794.88	3794.98	3796.08	3795.48	3795.58	3796.08	3795.98	3795.48	3794.78	3794.58	3794.38
3	3803.21	3803.21	3803.21	3803.21	3803.31	3803.31	3803.31	3803.31	3803.31	3803.31	3803.31	3802.41
28	3796.35	3796.35	3796.65	3797.55	3797.95	3797.55	3797.65	3797.55	3796.95	3796.55	3796.35	3796.25
32	3786.38	3786.18	3786.38	3784.98	3784.58	3787.08	3787.08	3787.28	3783.58	3785.48	3785.38	3785.38
31	3785.85	3785.85	3785.85	3786.35	3785.95	3786.05	3786.15	3785.95	3785.95	3786.05	3785.95	3784.65
30	3785.86	3785.86	3785.96	3786.86	3786.76	3786.56	3786.46	3786.36	3786.16	3786.06	3786.06	3785.06
29	3780.73	3780.73	3780.73	3781.03	3780.93	3781.03	3780.83	3780.63	3780.43	3780.23	3780.03	3779.03
38	3780.44	3780.34	3780.84	3781.34	3780.94	3781.14	3781.44	3781.24	3780.64	3780.14	3779.94	3779.94
1	3773.04	3772.84	3773.04	3772.74	3772.74	3772.64	3772.64	3772.64	3772.64	3772.64	3772.54	3769.94
2	3759.60	3759.40	3759.40	3759.90	3759.60	3760.10	3760.10	3760.10	3759.70	3759.50	3759.30	3759.30
[illegible]	3762.28	3761.88	3761.68	3762.28	3761.78	3761.68	3760.68	3760.78	3761.08	3761.68	3761.66	3761.78
37	3748.72	3746.72	3748.12	3748.52	3748.52	3748.82	3748.62	3748.92	3747.72	3747.32	3747.22	3747.12
36	3746.25	3746.25	3746.25	3746.45	3746.45	3746.45	3746.45	3746.45	3746.45	3746.55	3746.45	3745.55
35	3739.57	3739.57	3741.17	3740.67	3740.07	3740.87	3741.17	3741.07	3739.87	3739.57	3739.47	3739.47
33	3737.29	3737.29	3737.29	3737.39	3737.39	3737.49	3737.49	3737.49	3737.39	3737.59	3737.49	3736.29
34	3728.47	3728.27	3728.77	3729.37	3729.07	3728.87	3729.17	3729.17	3729.17	3728.87	3728.67	3728.47
VALLEY MEAN...	3825.90	3825.84	3825.93	3826.32	3825.99	3826.19	3826.24	3826.29	3826.01	3825.83	3825.75	3824.77
NODE 1 MEAN...	3886.17	3886.11	3886.03	3886.52	3886.15	3886.15	3886.22	3886.33	3886.29	3885.98	3885.98	3884.99
NODE 2 MEAN...	3789.14	3789.08	3789.29	3789.61	3789.31	3789.62	3789.66	3789.67	3789.25	3789.14	3789.01	3788.04

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1952, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3917.22	3917.02	3916.92	3916.92	3916.62	3916.62	3916.52	3916.82	3917.32	3916.82	3916.72	3916.52
20	3918.59	3918.79	3918.49	3918.39	3918.39	3918.59	3918.89	3919.49	3919.29	3919.09	3918.99	3918.69
19	3913.14	3912.94	3911.44	3912.24	3912.54	3912.94	3913.44	3913.04	3914.44	3913.34	3913.14	3912.94
15	3896.11	3896.01	3896.11	3896.41	3896.41	3896.61	3896.81	3897.11	3897.31	3896.91	3896.61	3896.31
18	3895.15	3895.35	3895.45	3894.15	3893.45	3894.65	3893.35	3895.25	3896.65	3895.85	3895.45	3895.25
17	3895.91	3895.61	3895.61	3895.11	3894.81	3894.81	3894.61	3895.01	3895.71	3895.41	3895.21	3895.01
16	3883.73	3883.53	3882.11	3882.81	3882.81	3882.43	3881.63	3883.03	3883.23	3883.13	3883.33	3883.63
12	3879.89	3879.79	3875.59	3877.59	3878.19	3876.69	3880.39	3880.09	3879.79	3880.49	3880.59	3880.49
11	3872.69	3872.39	3872.79	3874.59	3874.69	3874.99	3875.49	3875.59	3874.39	3873.79	3873.39	3872.99
13	3851.46	3851.36	3848.86	3850.26	3850.46	3850.36	3850.46	3851.36	3851.56	3851.06	3850.56	3850.36
14	3851.30	3851.20	3851.40	3851.20	3851.30	3851.40	3852.00	3851.90	3851.90	3851.60	3851.40	3851.30
10	3841.15	3840.95	3840.95	3840.95	3840.75	3840.65	3840.95	3841.25	3841.55	3841.35	3841.15	3840.95
9	3837.38	3837.38	3837.38	3837.28	3837.18	3837.18	3837.08	3837.08	3836.98	3836.98	3836.96	3836.78
8	3837.40	3837.20	3838.20	3838.50	3838.60	3839.00	3839.00	3839.10	3838.60	3838.10	3838.00	3837.90
25	3823.74	3823.24	3816.14	3819.54	3819.24	3820.54	3816.24	3816.24	3823.44	3821.84	3823.64	3824.04
7	3832.97	3832.77	3833.27	3833.77	3834.37	3834.57	3834.87	3835.17	3834.87	3834.27	3833.77	3833.47
6	3817.05	3816.85	3817.05	3816.75	3816.85	3817.25	3817.35	3817.95	3818.25	3817.75	3817.55	3817.45
5	3809.18	3809.08	3808.48	3808.38	3808.58	3808.88	3809.08	3809.38	3809.78	3809.68	3809.78	3809.68
24	3810.51	3810.51	3809.91	3810.41	3810.41	3810.91	3811.71	3812.01	3811.31	3810.91	3810.71	3810.51
4	3804.36	3804.36	3803.66	3803.76	3803.96	3803.96	3804.16	3804.36	3804.76	3804.76	3804.66	3804.76
27	3803.76	3803.66	3806.26	3804.26	3804.56	3805.06	3806.05	3807.56	3805.66	3804.56	3804.16	3803.96
21	3800.58	3800.48	3800.88	3800.88	3800.68	3800.88	3801.08	3801.58	3801.38	3800.98	3800.76	3800.68
23	3795.10	3795.90	3791.70	3794.30	3794.90	3792.40	3795.80	3798.30	3797.40	3795.70	3795.20	3795.80
22	3794.38	3794.38	3784.28	3794.18	3793.98	3793.98	3794.38	3794.58	3794.38	3794.68	3794.66	3794.98
3	3802.21	3802.41	3801.51	3802.91	3802.11	3802.01	3802.51	3802.81	3802.81	3802.61	3802.61	3802.61
28	3796.35	3796.15	3796.35	3796.75	3796.45	3796.55	3796.95	3797.15	3796.95	3796.65	3796.55	3796.45
32	3785.38	3784.78	3783.48	3785.08	3784.28	3784.98	3785.48	3786.78	3786.78	3784.68	3785.78	3785.78
31	3784.65	3784.45	3784.15	3784.95	3784.35	3784.45	3785.15	3785.65	3785.65	3785.25	3785.25	3785.25
30	3784.96	3784.86	3785.26	3786.16	3785.46	3785.96	3785.96	3786.26	3785.96	3785.46	3785.26	3784.86
39	3778.93	3778.73	3778.53	3778.53	3778.93	3778.93	3779.23	3779.63	3780.03	3779.63	3779.43	3779.13
29	3779.74	3779.64	3779.84	3780.74	3780.34	3780.24	3781.24	3781.14	3780.94	3780.34	3780.04	3779.94
38	3769.94	3769.74	3769.94	3770.44	3770.54	3771.34	3772.34	3772.94	3771.84	3770.84	3770.54	3770.44
1	3759.30	3759.30	3759.00	3759.60	3759.70	3759.90	3759.80	3759.90	3759.60	3759.40	3759.50	3759.20
2	3761.88	3761.18	3759.68	3761.18	3760.78	3760.68	3761.18	3760.88	3761.68	3761.68	3761.66	3761.88
37	3747.12	3747.22	3747.42	3747.32	3747.42	3747.62	3748.12	3748.52	3748.52	3747.92	3747.72	3747.72
36	3745.05	3745.05	3744.85	3744.85	3744.95	3745.45	3746.25	3747.15	3746.75	3746.25	3745.95	3745.75
35	3739.47	3739.27	3740.37	3740.17	3740.47	3740.97	3741.17	3741.17	3741.97	3739.47	3739.47	3739.47
33	3736.29	3736.29	3735.49	3736.99	3736.29	3737.69	3737.19	3737.59	3738.99	3736.59	3736.49	3736.49
34	3728.37	3728.37	3728.37	3728.57	3728.57	3728.57	3728.87	3729.07	3728.97	3728.77	3728.57	3727.87
VALLEY MEAN...	3824.69	3824.59	3823.87	3824.33	3824.34	3824.56	3824.69	3825.17	3825.45	3824.97	3824.84	3824.70
NODE 1 MEAN...	3884.75	3884.67	3883.75	3884.09	3884.04	3884.16	3884.23	3884.82	3885.11	3884.83	3884.53	3884.35
NODE 2 MEAN...	3788.07	3787.95	3787.35	3787.90	3787.93	3788.22	3788.39	3788.80	3789.07	3788.45	3788.44	3788.32

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1953, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3916.62	3916.62	3916.52	3916.22	3916.02	3916.02	3915.92	3916.02	3916.12	3915.52	3915.32	3915.32
20	3918.59	3918.49	3918.49	3918.99	3918.59	3918.19	3918.29	3919.69	3918.99	3918.59	3917.79	3917.69
19	3912.84	3912.74	3912.04	3912.54	3912.34	3912.04	3911.94	3911.94	3912.04	3912.14	3911.94	3911.84
15	3896.31	3896.01	3896.11	3896.61	3896.51	3896.71	3896.61	3896.51	3896.61	3896.21	3895.91	3895.81
18	3895.15	3894.85	3893.95	3894.65	3893.55	3894.15	3893.85	3893.85	3894.65	3894.05	3893.85	3893.95
17	3894.91	3894.71	3894.61	3894.71	3894.41	3894.31	3894.31	3894.31	3894.41	3894.11	3894.01	3893.81
16	3883.63	3883.33	3881.83	3882.93	3882.43	3882.13	3881.83	3882.43	3882.53	3882.03	3882.83	3882.73
12	3880.49	3880.19	3875.39	3879.99	3879.49	3876.59	3879.49	3877.19	3878.59	3879.49	3879.69	3879.89
11	3872.79	3872.59	3874.39	3874.69	3874.49	3874.99	3875.19	3875.49	3874.59	3873.59	3872.89	3874.69
13	3851.86	3851.46	3850.96	3851.36	3850.46	3851.08	3846.86	3849.56	3849.76	3849.86	3850.36	3850.26
14	3851.10	3851.10	3851.00	3851.40	3850.90	3850.60	3850.80	3851.50	3851.30	3850.60	3850.30	3850.10
10	3840.85	3840.75	3840.65	3840.85	3840.65	3840.85	3840.45	3840.35	3840.75	3840.45	3840.35	3840.55
9	3837.48	3837.18	3837.18	3836.78	3835.78	3837.28	3835.58	3835.88	3835.48	3837.18	3837.18	3837.08
8	3837.80	3837.80	3838.30	3838.70	3837.80	3838.30	3838.40	3838.40	3838.40	3837.90	3837.40	3837.50
25	3823.74	3822.64	3823.84	3824.94	3824.48	3825.14	3825.74	3823.44	3823.74	3823.74	3823.94	3823.54
7	3833.27	3833.97	3833.47	3834.67	3834.87	3834.97	3815.17	3835.07	3834.87	3834.17	3833.47	3833.17
6	3814.85	3814.55	3815.05	3816.25	3816.45	3816.55	3816.75	3816.65	3816.45	3815.75	3815.05	3814.75
5	3809.48	3809.48	3808.28	3809.58	3808.98	3809.28	3809.58	3808.88	3809.38	3809.58	3809.48	3809.58
24	3810.41	3810.01	3810.21	3811.21	3810.61	3810.81	3811.31	3810.81	3811.61	3810.51	3810.51	3810.21
4	3804.66	3804.46	3803.96	3804.46	3804.26	3804.16	3804.16	3804.06	3804.56	3804.56	3804.66	3804.76
3	3803.86	3803.66	3803.46	3804.66	3804.36	3804.86	3805.26	3806.76	3806.16	3804.56	3805.76	3803.76
27	3800.58	3800.48	3800.88	3800.88	3800.88	3800.88	3801.08	3801.28	3801.48	3800.78	3800.58	3800.38
21	3795.70	3794.90	3807.50	3794.50	3793.30	3793.40	3791.30	3796.70	3798.20	3797.30	3797.10	3796.00
23	3794.18	3794.20	3793.88	3794.48	3794.68	3794.08	3792.48	3793.38	3793.38	3794.58	3794.48	3794.48
22	3802.71	3802.51	3802.31	3802.51	3802.31	3802.31	3802.61	3802.51	3802.71	3802.61	3802.71	3802.61
28	3796.35	3796.35	3796.65	3797.15	3797.15	3796.75	3797.05	3797.55	3797.25	3796.05	3796.45	3796.35
32	3785.68	3785.38	3785.28	3785.58	3783.78	3785.48	3785.28	3785.98	3786.58	3785.88	3785.78	3785.38
31	3785.45	3785.45	3785.45	3785.45	3785.05	3785.05	3785.25	3785.45	3785.95	3785.35	3785.35	3785.65
30	3784.86	3784.76	3784.96	3785.86	3785.56	3785.16	3786.26	3786.66	3786.46	3785.45	3785.16	3785.00
29	3779.13	3779.03	3778.73	3779.73	3779.53	3779.33	3779.93	3780.13	3780.63	3779.63	3779.43	3779.43
39	3779.64	3779.84	3780.84	3780.64	3780.34	3780.44	3780.94	3781.44	3780.94	3780.34	3780.24	3780.24
38	3770.44	3770.34	3771.04	3771.44	3771.14	3772.24	3772.24	3771.44	3771.74	3770.64	3770.34	3770.44
1	3759.30	3759.20	3760.90	3759.80	3759.80	3760.00	3759.80	3759.70	3760.00	3759.50	3759.50	3759.40
2	3761.98	3761.38	3761.28	3761.48	3760.78	3760.68	3760.18	3760.48	3761.08	3761.28	3761.78	3761.68
37	3747.62	3747.42	3747.82	3748.02	3747.82	3747.62	3748.02	3748.02	3748.02	3747.52	3747.42	3747.32
36	3745.65	3745.95	3746.15	3746.65	3746.05	3746.15	3746.85	3746.55	3746.65	3746.05	3745.85	3745.45
35	3739.47	3739.17	3740.27	3740.27	3740.07	3740.47	3740.87	3740.87	3744.27	3739.37	3739.37	3739.27
33	3736.59	3736.49	3736.99	3737.19	3737.09	3737.69	3737.69	3737.69	3737.49	3736.69	3736.69	3736.59
34	3727.87	3727.97	3728.67	3728.67	3728.47	3728.87	3728.97	3728.77	3728.97	3728.07	3727.87	3727.67
VALLEY MEAN...	3824.72	3824.50	3824.65	3825.01	3824.59	3824.80	3824.48	3824.73	3824.92	3824.47	3824.40	3824.28
NODE 1 MEAN...	3884.68	3884.45	3883.99	3884.50	3883.95	3884.05	3883.02	3883.77	3883.91	3883.73	3883.72	3883.65
NODE 2 MEAN...	3788.14	3787.94	3788.47	3788.73	3788.39	3788.67	3788.79	3788.73	3788.95	3788.32	3788.23	3788.07

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1954, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3915.22	3915.22	3914.92	3914.62	3914.22	3914.02	3913.52	3912.62	3912.32	3912.12	3912.02	3912.12
20	3917.79	3917.59	3917.48	3917.39	3916.99	3917.09	3916.69	3915.96	3915.59	3916.19	3915.69	3915.69
19	3911.74	3911.64	3910.24	3910.14	3910.24	3909.74	3909.14	3909.04	3908.84	3909.44	3909.14	3909.24
15	3895.81	3895.61	3895.01	3895.61	3895.71	3895.21	3894.91	3894.81	3894.41	3894.51	3894.41	3894.11
18	3893.85	3893.65	3892.65	3892.55	3891.65	3891.75	3891.45	3890.85	3890.15	3890.55	3890.95	3890.25
17	3893.71	3893.51	3893.21	3892.61	3892.01	3891.61	3891.01	3889.61	3890.01	3889.91	3890.01	3889.91
16	3882.71	3882.63	3882.03	3881.53	3881.23	3880.03	3878.83	3879.03	3879.13	3880.43	3880.83	3881.03
12	3874.89	3878.59	3878.79	3878.99	3879.19	3875.59	3873.39	3877.69	3877.89	3879.29	3878.89	3879.29
11	3872.49	3872.29	3872.49	3874.19	3874.09	3874.09	3873.89	3873.39	3872.79	3872.89	3872.59	3872.49
13	3849.66	3849.06	3848.66	3848.06	3847.96	3847.86	3846.36	3845.96	3846.86	3847.66	3847.66	3847.40
14	3850.00	3849.80	3849.30	3849.40	3849.10	3848.60	3848.60	3848.10	3847.70	3847.40	3847.30	3847.10
10	3840.35	3840.35	3840.05	3839.75	3839.45	3839.15	3838.75	3838.45	3838.25	3839.35	3838.45	3838.45
9	3837.08	3836.88	3835.98	3835.48	3835.18	3834.18	3828.98	3833.48	3834.38	3835.38	3835.66	3835.58
8	3837.90	3837.50	3836.70	3837.30	3836.40	3836.30	3835.80	3834.70	3835.20	3835.70	3836.00	3836.30
25	3823.74	3821.84	3820.44	3817.04	3817.04	3816.54	3815.24	3819.74	3820.34	3822.14	3821.84	3822.44
7	3833.07	3832.87	3832.67	3833.77	3833.87	3833.57	3833.37	3832.97	3832.37	3831.97	3831.67	3831.47
6	3817.15	3816.85	3816.45	3816.15	3815.85	3815.75	3815.35	3814.75	3814.45	3814.95	3814.75	3815.05
5	3809.68	3808.98	3808.48	3808.68	3808.68	3807.68	3807.08	3806.48	3806.48	3806.78	3806.78	3808.78
24	3810.31	3810.31	3809.81	3809.71	3810.01	3810.01	3810.31	3810.41	3809.91	3810.01	3810.01	3809.91
4	3804.76	3804.56	3803.96	3803.66	3803.36	3803.16	3802.76	3802.06	3801.86	3802.16	3802.36	3802.66
27	3803.86	3803.56	3803.06	3803.56	3803.36	3803.16	3804.16	3803.46	3802.66	3802.86	3803.06	3803.16
21	3800.58	3800.58	3800.48	3800.68	3800.38	3800.48	3800.38	3800.48	3800.18	3800.28	3800.26	3800.18
23	3796.80	3792.00	3792.50	3792.50	3792.40	3790.40	3790.40	3791.30	3792.10	3793.40	3794.10	3795.20
22	3794.48	3794.38	3790.98	3792.98	3793.18	3792.38	3791.78	3791.28	3791.98	3790.88	3792.96	3793.28
3	3802.71	3802.51	3802.11	3802.01	3801.41	3800.91	3800.41	3799.91	3800.11	3800.41	3800.61	3801.01
28	3796.35	3796.45	3796.45	3796.75	3796.55	3796.55	3796.75	3797.15	3796.45	3796.35	3796.25	3796.25
32	3785.68	3785.08	3784.08	3784.18	3782.58	3783.38	3784.08	3782.88	3782.48	3782.88	3782.96	3781.08
31	3785.75	3785.75	3784.55	3784.75	3784.35	3784.75	3784.95	3784.35	3783.95	3784.05	3783.85	3784.25
30	3784.96	3784.96	3784.86	3785.56	3785.06	3784.86	3784.96	3784.86	3784.56	3784.56	3784.46	3784.46
29	3779.23	3779.03	3777.83	3778.33	3778.83	3778.23	3777.93	3778.03	3778.13	3778.23	3778.33	3778.53
39	3780.24	3780.54	3780.54	3781.04	3780.64	3781.54	3780.84	3781.14	3780.24	3779.94	3779.84	3779.54
38	3770.34	3769.74	3767.64	3768.44	3769.34	3768.34	3767.34	3767.84	3768.04	3767.64	3767.64	3767.94
1	3759.40	3759.40	3759.10	3759.50	3759.50	3759.40	3759.30	3759.30	3757.70	3757.70	3756.30	3756.60
2	3761.98	3760.98	3759.08	3758.98	3759.18	3758.88	3758.88	3757.88	3757.98	3758.28	3758.26	3758.68
37	3747.42	3747.22	3747.22	3747.02	3747.02	3746.72	3746.42	3746.92	3745.92	3745.92	3745.82	3745.92
36	3745.65	3745.55	3744.65	3744.75	3744.35	3744.15	3744.15	3743.35	3743.05	3743.45	3743.15	3743.35
35	3739.47	3739.27	3739.47	3740.17	3739.67	3740.07	3739.57	3739.77	3738.77	3738.77	3738.67	3738.67
33	3736.79	3736.69	3735.59	3736.89	3736.89	3736.09	3736.19	3735.89	3736.29	3736.39	3736.49	3736.49
34	3727.87	3727.67	3727.77	3728.17	3727.87	3727.47	3727.57	3728.37	3727.67	3727.37	3727.47	3727.47
VALLEY MEAN...	3824.33	3823.96	3823.33	3823.31	3823.14	3822.79	3822.20	3822.20	3822.13	3822.44	3822.38	3822.40
NODE 1 MEAN...	3883.45	3883.15	3882.68	3882.47	3882.18	3881.82	3880.95	3880.70	3880.82	3881.28	3881.25	3881.08
NODE 2 MEAN...	3788.27	3787.86	3787.14	3787.23	3787.13	3786.80	3786.39	3786.53	3786.35	3786.55	3786.48	3786.62

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1955. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3912.12	3912.22	3911.92	3911.32	3911.02	3910.42	3909.82	3909.32	3909.12	3909.02	3909.22	3909.52
20	3915.59	3915.69	3915.39	3913.99	3913.29	3911.89	3911.79	3912.89	3912.74	3912.89	3913.49	3913.69
19	3909.14	3908.84	3908.04	3907.94	3907.44	3907.24	3906.44	3906.74	3906.61	3907.24	3907.44	3907.44
15	3893.91	3893.71	3893.21	3893.71	3893.21	3892.71	3893.31	3893.11	3893.21	3893.51	3893.41	3893.11
18	3890.65	3890.65	3890.25	3889.35	3889.05	3887.95	3887.55	3887.65	3887.35	3888.05	3886.35	3888.65
17	3889.81	3889.71	3888.71	3888.91	3887.91	3887.21	3886.91	3886.71	3886.71	3886.91	3887.41	3887.01
16	3881.33	3881.43	3880.53	3879.53	3878.83	3878.03	3877.53	3877.03	3874.83	3878.83	3879.93	3880.43
12	3879.39	3879.69	3879.29	3877.49	3877.99	3877.29	3877.39	3877.49	3875.79	3878.79	3879.39	3879.49
11	3872.29	3871.99	3871.49	3873.39	3872.69	3872.39	3873.19	3873.19	3873.39	3872.79	3872.29	3872.09
13	3847.36	3847.26	3846.56	3844.86	3844.96	3844.46	3843.06	3842.88	3842.56	3843.38	3843.88	3844.06
14	3846.90	3846.70	3845.90	3845.80	3845.70	3845.10	3844.60	3844.80	3846.30	3846.10	3846.10	3846.10
10	3838.45	3838.35	3837.85	3838.25	3837.55	3837.05	3836.65	3836.55	3836.25	3836.55	3836.45	3836.55
9	3835.48	3835.38	3833.38	3833.08	3833.98	3831.28	3831.88	3830.48	3832.88	3833.68	3833.78	3833.88
8	3836.20	3836.80	3836.10	3836.40	3835.50	3834.70	3834.30	3833.30	3833.10	3834.10	3834.10	3834.50
23	3821.04	3818.66	3815.64	3817.44	3815.14	3815.04	3815.14	3815.74	3818.54	3819.54	3820.54	3821.04
7	3831.27	3831.17	3831.17	3831.47	3830.87	3830.87	3830.77	3829.97	3829.97	3829.17	3828.87	3828.67
6	3815.25	3815.15	3815.05	3814.35	3813.95	3813.45	3811.15	3812.95	3812.75	3812.35	3812.55	3812.95
5	3807.08	3807.18	3805.98	3805.88	3805.08	3804.38	3804.38	3803.68	3802.88	3803.68	3803.98	3804.48
24	3809.91	3809.91	3809.81	3809.11	3809.01	3808.71	3809.01	3808.91	3809.51	3809.71	3809.71	3809.71
4	3802.86	3802.86	3802.16	3801.66	3801.26	3800.76	3800.26	3799.96	3793.86	3800.38	3800.76	3801.16
27	3803.26	3803.36	3801.96	3802.76	3802.16	3801.36	3802.76	3802.36	3802.56	3802.76	3802.76	3802.96
21	3800.48	3800.48	3800.08	3800.18	3799.98	3799.78	3799.98	3799.88	3799.78	3799.68	3799.78	3799.98
22	3795.70	3795.00	3793.20	3791.80	3790.90	3790.30	3790.30	3790.50	3791.80	3793.00	3794.20	3794.70
2	3792.78	3793.38	3792.68	3789.18	3792.68	3792.18	3792.38	3787.28	3792.48	3792.68	3792.68	3792.98
23	3801.21	3801.01	3800.21	3799.71	3799.31	3798.81	3798.61	3798.11	3798.21	3798.81	3796.31	3797.71
28	3796.25	3796.25	3796.25	3796.25	3796.05	3795.95	3796.25	3795.35	3796.05	3795.75	3795.75	3795.75
32	3783.48	3783.38	3781.88	3782.58	3782.18	3781.78	3781.88	3781.78	3781.68	3781.88	3782.08	3782.38
31	3784.55	3784.25	3783.65	3783.75	3783.55	3783.45	3783.65	3783.55	3783.35	3781.65	3783.35	3783.65
30	3784.46	3787.36	3787.06	3786.76	3786.56	3786.36	3786.56	3786.86	3786.76	3786.76	3786.76	3786.76
39	3778.73	3778.83	3776.93	3776.83	3776.03	3775.33	3775.23	3775.73	3775.73	3775.93	3775.93	3776.23
29	3779.64	3779.74	3779.54	3779.34	3779.54	3779.04	3779.24	3779.54	3779.24	3779.04	3776.84	3779.04
38	3768.14	3767.24	3763.74	3765.94	3765.14	3765.14	3766.34	3766.24	3766.14	3766.04	3765.84	3765.84
1	3759.10	3759.00	3754.90	3754.90	3754.60	3753.90	3756.40	3752.80	3753.20	3753.60	3753.80	3754.30
2	3758.88	3758.18	3757.38	3757.28	3756.98	3756.58	3756.48	3755.98	3755.78	3756.18	3756.48	3756.78
37	3746.02	3746.12	3745.62	3745.62	3745.42	3745.22	3745.02	3744.92	3744.72	3745.02	3744.92	3745.02
36	3743.55	3743.25	3743.35	3742.48	3741.75	3741.35	3740.95	3740.75	3740.65	3740.65	3740.95	3741.55
35	3738.77	3739.87	3737.87	3739.27	3738.37	3738.37	3738.97	3739.17	3739.07	3738.27	3737.77	3737.57
33	3736.59	3736.39	3735.99	3736.29	3735.29	3735.59	3736.09	3736.99	3737.59	3737.29	3736.99	3736.89
34	3727.47	3727.57	3727.47	3727.77	3727.07	3726.87	3727.67	3727.97	3727.37	3726.97	3727.17	3727.07
VALLEY MEAN...	3822,55	3822,41	3821,36	3821,18	3820,72	3820,20	3820.17	3819,97	3819,99	3820,35	3820,56	3820.74
NODE 1 MEAN...	3881,07	3881,00	3880,35	3879,72	3879,40	3878,70	3878,20	3878,18	3878,04	3878,64	3878,98	3879,03
NODE 2 MEAN...	3786,86	3786,68	3785,39	3785,49	3784,93	3784,53	3784,77	3784,39	3784,60	3784,79	3784,94	3785,19

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1956, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3909.62	3909.72	3909.92	3909.52	3909.12	3908.62	3908.22	3907.72	3907.22	3906.92	3907.12	3907.32
20	3913.99	3913.89	3912.09	3911.99	3911.99	3910.29	3909.69	3911.49	3909.49	3910.79	3911.49	3911.69
19	3907.44	3907.24	3905.64	3906.54	3906.24	3905.84	3905.64	3905.04	3905.04	3905.24	3905.24	3903.24
15	3892.81	3892.51	3892.01	3893.31	3892.91	3892.81	3892.51	3892.71	3892.31	3892.01	3891.91	3891.61
18	3888.55	3888.55	3887.15	3887.55	3887.05	3886.55	3885.65	3885.45	3885.15	3884.75	3885.35	3885.75
17	3887.61	3887.71	3883.41	3885.01	3884.11	3885.01	3883.81	3880.41	3883.51	3883.81	3884.11	3884.31
16	3880.43	3880.43	3879.51	3878.93	3879.03	3877.33	3876.83	3876.73	3876.43	3877.03	3876.33	3878.83
12	3879.49	3879.29	3874.49	3876.79	3876.59	3874.99	3874.39	3874.89	3876.69	3876.79	3877.59	3877.89
11	3871.79	3870.79	3870.39	3872.09	3872.49	3872.49	3872.79	3872.09	3872.29	3871.69	3871.09	3870.79
13	3844.16	3843.76	3842.76	3842.66	3842.36	3841.46	3839.76	3839.46	3839.86	3840.36	3840.76	3840.96
14	3843.40	3843.40	3843.10	3843.10	3843.10	3842.60	3842.70	3841.90	3841.40	3841.70	3841.10	3840.80
10	3836.55	3836.45	3836.25	3836.15	3836.05	3835.45	3835.05	3834.55	3834.25	3834.15	3834.15	3834.25
9	3833.88	3833.38	3833.18	3831.78	3831.98	3831.28	3830.58	3829.58	3830.08	3831.08	3831.48	3831.58
8	3833.80	3833.00	3832.50	3833.20	3834.50	3833.10	3832.10	3832.80	3832.80	3832.60	3832.80	3833.10
25	3821.34	3821.44	3821.14	3821.04	3820.44	3819.94	3818.84	3818.84	3819.04	3818.94	3819.04	3819.34
7	3828.67	3828.57	3828.37	3829.77	3829.27	3829.27	3829.17	3828.77	3828.07	3827.57	3827.27	3827.27
6	3813.15	3813.25	3812.75	3812.55	3812.15	3811.55	3811.15	3810.95	3810.55	3810.35	3810.25	3810.55
5	3804.68	3802.98	3803.48	3803.38	3802.38	3802.08	3801.48	3800.68	3800.28	3800.78	3801.38	3801.88
24	3809.71	3809.71	3809.51	3809.71	3809.41	3809.21	3808.91	3809.01	3808.91	3808.91	3808.81	3809.81
4	3801.26	3801.26	3800.46	3800.16	3799.76	3799.36	3798.66	3798.26	3798.16	3798.36	3798.66	3798.96
27	3802.96	3803.06	3802.06	3803.56	3803.16	3802.86	3802.46	3802.36	3801.66	3801.66	3801.66	3801.66
21	3800.08	3800.18	3799.98	3800.38	3800.38	3799.88	3799.88	3799.58	3799.28	3798.98	3798.78	3798.78
23	3794.80	3794.90	3792.80	3792.20	3791.60	3791.30	3789.50	3789.70	3789.80	3790.40	3790.60	3791.20
22	3792.98	3793.18	3791.08	3792.28	3787.38	3788.88	3790.58	3790.08	3790.28	3790.38	3789.98	3792.68
3	3799.81	3799.71	3798.91	3798.81	3798.41	3798.21	3797.31	3797.11	3797.11	3797.41	3797.41	3797.61
28	3795.75	3795.75	3795.75	3796.15	3795.05	3795.65	3795.55	3795.45	3795.15	3795.05	3794.75	3794.75
32	3782.38	3782.68	3776.68	3781.48	3779.88	3778.68	3778.98	3778.78	3779.98	3779.98	3780.78	3781.18
31	3783.55	3783.95	3784.55	3783.55	3783.35	3782.55	3782.85	3782.25	3782.15	3781.95	3782.25	3782.35
30	3786.76	3786.86	3786.46	3786.96	3786.66	3786.26	3785.96	3786.36	3785.96	3785.76	3785.76	3785.76
39	3776.23	3776.53	3775.53	3775.33	3774.33	3774.33	3773.73	3773.83	3773.83	3773.93	3774.33	3774.43
29	3779.04	3779.14	3778.74	3779.24	3778.74	3778.54	3778.54	3778.34	3778.14	3777.94	3777.84	3777.84
38	3765.94	3765.94	3764.94	3764.54	3763.04	3764.54	3761.94	3762.34	3763.24	3763.54	3763.74	3763.84
1	3754.60	3754.50	3753.20	3752.80	3752.30	3751.30	3750.30	3750.30	3750.00	3750.30	3750.90	3751.40
2	3756.98	3756.88	3756.28	3756.08	3755.68	3755.18	3754.58	3754.48	3754.28	3754.38	3754.48	3754.78
37	3745.12	3745.22	3745.12	3745.02	3744.72	3744.62	3744.42	3744.52	3744.22	3744.02	3743.82	3743.92
36	3741.75	3742.15	3742.65	3742.55	3741.98	3741.95	3741.15	3741.05	3740.55	3740.85	3741.45	3741.85
35	3737.37	3737.27	3737.77	3739.67	3738.57	3739.07	3739.17	3739.37	3738.57	3738.07	3737.67	3737.57
33	3736.69	3736.59	3736.09	3736.99	3736.69	3735.89	3735.59	3736.69	3736.89	3736.69	3736.49	3736.49
34	3727.27	3727.07	3727.07	3727.57	3727.07	3726.97	3726.97	3727.07	3726.47	3726.37	3726.67	3726.87
VALLEY MEAN...	3820.77	3820.67	3819.66	3819.98	3819.50	3819.15	3818.40	3818.15	3818.25	3818.38	3818.59	3818.74
NODE 1 MEAN...	3879.03	3878.85	3877.26	3877.75	3877.41	3876.92	3876.07	3875.44	3875.85	3876.09	3876.39	3876.39
NODE 2 MEAN...	3785.24	3785.19	3784.54	3784.75	3784.19	3783.92	3783.24	3783.21	3783.13	3783.18	3783.34	3783.57

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1957, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3907.52	3907.72	3907.32	3906.82	3906.52	3906.22	3905.82	3905.92	3906.62	3906.92	3907.42	3907.92
20	3912.39	3911.79	3911.19	3909.99	3909.69	3908.29	3907.69	3912.09	3912.79	3913.09	3913.69	3913.99
19	3904.74	3904.94	3903.84	3903.34	3903.94	3903.24	3903.14	3905.64	3906.44	3906.74	3907.04	3907.14
15	3891.51	3890.91	3890.21	3891.61	3891.31	3891.71	3892.21	3893.01	3893.61	3893.71	3893.71	3893.71
18	3885.85	3885.65	3884.35	3883.65	3883.95	3884.25	3883.95	3884.65	3885.85	3885.85	3886.55	3886.15
17	3884.51	3884.51	3883.11	3883.21	3882.31	3882.51	3882.11	3883.11	3883.81	3884.21	3884.61	3884.81
16	3879.23	3879.33	3878.23	3877.03	3877.03	3876.03	3875.53	3877.43	3879.03	3879.53	3880.33	3881.33
12	3877.99	3877.89	3872.19	3874.39	3873.19	3875.09	3875.59	3877.69	3878.89	3879.19	3879.59	3879.59
11	3870.69	3870.39	3869.69	3871.69	3871.59	3871.99	3872.49	3874.09	3874.79	3873.89	3873.49	3873.19
13	3841.26	3841.16	3840.46	3839.36	3839.56	3838.66	3838.06	3838.16	3839.46	3840.66	3841.26	3841.56
14	3840.70	3840.70	3840.40	3840.10	3839.80	3839.20	3838.80	3839.10	3839.50	3840.00	3840.20	3840.40
10	3834.35	3834.45	3834.25	3833.95	3833.55	3833.25	3833.05	3833.35	3833.75	3834.05	3834.45	3834.65
9	3831.38	3831.28	3831.28	3829.58	3829.88	3832.48	3829.18	3830.38	3830.98	3831.48	3831.68	3831.68
8	3833.10	3833.40	3833.00	3831.10	3831.20	3832.70	3833.30	3833.90	3836.10	3835.60	3836.00	3835.40
25	3819.54	3819.74	3818.74	3818.34	3817.44	3817.04	3817.54	3819.24	3821.44	3821.84	3821.84	3821.94
7	3827.27	3827.27	3827.27	3828.07	3827.27	3827.37	3827.77	3827.97	3828.37	3828.37	3826.27	3828.27
6	3810.85	3811.05	3810.65	3808.75	3809.35	3808.95	3808.35	3808.85	3809.55	3810.05	3810.65	3811.25
5	3802.28	3802.58	3801.08	3801.08	3800.48	3800.18	3799.28	3800.28	3800.88	3801.68	3802.38	3802.98
24	3808.91	3808.81	3808.71	3807.91	3807.71	3807.81	3808.21	3808.91	3809.91	3809.91	3809.91	3809.91
4	3799.26	3799.36	3798.56	3797.96	3797.46	3797.16	3796.66	3797.46	3797.96	3798.46	3799.26	3799.96
27	3801.76	3801.76	3801.56	3801.46	3800.96	3800.96	3801.66	3802.56	3803.56	3803.26	3803.16	3803.16
21	3798.88	3798.98	3798.88	3798.58	3798.38	3798.08	3798.08	3798.58	3798.88	3798.98	3799.18	3799.38
23	3792.00	3792.50	3791.80	3789.50	3789.40	3788.20	3788.20	3790.30	3791.90	3792.90	3793.60	3794.30
22	3792.78	3792.88	3791.98	3792.28	3791.68	3794.08	3791.48	3792.88	3792.98	3793.38	3793.38	3793.58
3	3798.01	3797.91	3797.31	3796.31	3796.11	3796.61	3795.21	3797.51	3797.91	3798.31	3798.81	3799.01
28	3794.75	3794.85	3794.85	3794.65	3794.75	3794.85	3794.95	3795.15	3795.65	3795.45	3795.25	3795.15
32	3781.48	3781.58	3777.98	3780.68	3779.98	3777.88	3778.98	3781.08	3781.78	3782.08	3762.28	3782.48
31	3782.55	3782.65	3782.85	3782.25	3781.95	3781.65	3781.65	3782.35	3782.95	3782.95	3782.95	3782.95
30	3785.66	3785.66	3785.56	3785.16	3785.06	3785.06	3785.56	3785.96	3786.46	3786.16	3786.06	3786.06
39	3774.83	3774.93	3773.63	3772.93	3772.93	3771.73	3771.63	3773.13	3774.53	3775.23	3775.73	3776.03
29	3777.94	3777.84	3777.64	3778.14	3777.74	3777.94	3779.04	3777.94	3778.44	3778.14	3778.04	3778.04
38	3764.04	3764.14	3761.84	3762.24	3761.64	3761.04	3763.14	3763.94	3764.24	3764.04	3764.24	3763.94
1	3752.10	3752.10	3751.00	3749.90	3749.80	3749.20	3749.10	3749.70	3750.80	3750.90	3751.50	3751.90
2	3755.08	3755.18	3754.48	3753.98	3753.78	3753.48	3753.48	3753.58	3753.78	3753.98	3754.38	3754.98
37	3744.12	3743.92	3743.62	3742.72	3742.62	3742.52	3742.62	3743.32	3744.02	3744.32	3744.82	3745.12
36	3742.25	3742.55	3742.25	3741.55	3741.65	3741.95	3742.45	3742.65	3743.15	3743.45	3743.75	3744.05
35	3737.47	3737.47	3737.17	3738.87	3738.27	3738.97	3740.47	3740.77	3740.57	3739.67	3739.67	3738.57
33	3736.29	3736.29	3735.59	3736.29	3736.29	3736.79	3737.49	3737.79	3737.89	3737.39	3737.29	3737.19
34	3726.87	3726.97	3776.97	3726.87	3726.77	3726.87	3727.17	3727.77	3727.77	3727.17	3726.67	3726.67
VALLEY MEAN...	3819,00	3819,01	3818,13	3817,72	3817,54	3817,36	3817,31	3818,22	3819,06	3819,34	3819,67	3819,81
NODE 1 MEAN...	3876,68	3876,58	3875,57	3875,20	3875,08	3874,86	3874,48	3875,55	3876,44	3876,90	3877,33	3877,46
NODE 2 MEAN...	3783,81	3783,90	3783,10	3782,67	3782,44	3782,29	3782,45	3783,27	3784,06	3784,23	3784,51	3784,65

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1958, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3908.42	3908.52	3908.82	3909.42	3910.02	3910.92	3911.82	3913.32	3913.92	3914.32	3914.62	3914.72
20	3914.09	3914.09	3914.69	3915.49	3916.39	3917.19	3918.49	3919.59	3920.29	3919.69	3919.39	3919.09
19	3907.44	3907.34	3907.54	3908.64	3909.74	3910.84	3911.94	3913.44	3914.24	3914.04	3913.54	3913.24
15	3893.81	3893.51	3894.11	3895.01	3895.51	3896.01	3896.21	3896.41	3896.81	3896.51	3896.11	3895.81
18	3887.05	3886.85	3887.25	3888.15	3888.75	3890.05	3890.95	3891.75	3892.35	3891.75	3892.25	3891.35
17	3885.11	3885.11	3885.01	3885.91	3886.31	3887.21	3887.41	3888.81	3889.61	3889.81	3889.91	3889.91
16	3881.93	3881.13	3881.13	3881.63	3882.33	3882.83	3883.43	3884.03	3884.43	3884.53	3884.33	3884.03
12	3879.99	3879.69	3879.99	3880.79	3881.09	3881.49	3882.09	3882.09	3881.89	3881.79	3881.59	3880.69
11	3872.89	3872.29	3874.69	3875.39	3875.59	3876.39	3876.19	3876.59	3875.99	3875.09	3874.19	3873.49
13	3841.96	3841.76	3841.96	3842.76	3844.16	3845.46	3846.16	3847.36	3847.96	3848.36	3848.46	3848.46
14	3840.70	3840.60	3840.70	3841.40	3841.60	3842.00	3843.20	3844.40	3845.30	3845.50	3845.60	3845.60
10	3834.95	3834.85	3835.45	3836.25	3835.65	3836.05	3836.65	3837.35	3838.05	3838.45	3838.75	3838.95
9	3831.98	3831.78	3831.88	3833.18	3832.78	3833.58	3833.98	3835.38	3835.88	3836.28	3836.18	3836.16
8	3836.30	3836.20	3836.40	3840.00	3840.80	3841.30	3841.10	3840.50	3839.80	3838.80	3838.30	3837.80
25	3822.14	3822.04	3822.64	3824.04	3825.54	3827.64	3828.84	3829.64	3828.54	3827.94	3827.34	3827.24
7	3828.47	3828.27	3828.77	3830.07	3831.87	3833.37	3833.67	3833.87	3833.67	3833.17	3832.67	3832.27
6	3811.85	3812.05	3812.25	3813.25	3813.85	3815.75	3817.15	3817.85	3818.35	3818.15	3817.85	3817.55
5	3803.48	3803.58	3803.98	3804.68	3805.68	3808.18	3809.58	3810.18	3810.08	3809.68	3809.38	3809.18
24	3810.01	3809.91	3810.21	3811.01	3811.41	3812.21	3811.11	3813.71	3813.61	3812.41	3812.11	3811.91
4	3800.66	3800.56	3800.86	3801.46	3802.06	3802.76	3803.76	3804.36	3805.36	3805.66	3805.46	3805.26
27	3803.36	3803.26	3804.06	3805.46	3805.96	3807.56	3808.66	3808.86	3807.96	3806.56	3805.86	3805.56
21	3799.68	3799.68	3799.98	3800.88	3801.28	3801.68	3802.58	3803.38	3803.78	3803.28	3802.88	3802.88
23	3794.80	3794.90	3795.20	3796.20	3796.70	3799.00	3799.80	3799.90	3799.80	3799.70	3796.80	3798.30
22	3793.48	3793.68	3793.88	3795.18	3795.08	3796.88	3796.58	3798.18	3798.58	3798.08	3797.58	3797.38
3	3799.51	3799.61	3800.01	3800.71	3801.01	3801.81	3802.91	3803.81	3804.61	3804.21	3803.91	3803.81
28	3795.35	3795.25	3795.35	3796.15	3796.55	3797.05	3797.85	3799.75	3799.15	3798.75	3798.55	3798.35
32	3782.60	3782.78	3783.18	3784.28	3784.38	3785.38	3786.28	3787.28	3788.08	3787.38	3787.08	3786.76
31	3783.15	3782.95	3783.65	3784.15	3784.45	3784.95	3785.55	3786.35	3787.25	3787.25	3786.45	3785.95
30	3786.16	3786.06	3786.36	3787.16	3787.46	3788.06	3788.96	3790.06	3790.06	3789.66	3789.30	3789.16
39	3776.43	3776.23	3776.43	3777.43	3779.53	3780.93	3782.33	3782.73	3782.33	3781.73	3781.23	3781.03
29	3778.24	3778.04	3778.44	3778.94	3779.04	3779.04	3779.64	3780.04	3780.34	3780.44	3780.34	3780.24
38	3764.54	3764.54	3765.14	3765.94	3767.04	3768.54	3770.24	3771.54	3772.14	3771.44	3771.04	3770.94
1	3752.40	3752.60	3752.80	3753.30	3753.90	3754.20	3754.90	3760.40	3760.70	3760.50	3760.40	3760.50
2	3755.38	3755.28	3755.38	3755.68	3755.78	3755.98	3756.38	3756.68	3757.48	3758.18	3758.08	3759.08
37	3745.42	3745.52	3745.62	3746.32	3746.32	3747.02	3747.52	3747.82	3749.12	3749.22	3748.62	3748.32
36	3744.35	3744.35	3744.75	3745.55	3746.15	3747.15	3747.95	3748.75	3749.05	3748.75	3748.25	3748.05
35	3738.77	3738.37	3739.87	3741.07	3740.97	3741.67	3741.67	3741.67	3741.67	3742.57	3740.87	3740.77
33	3737.09	3736.89	3738.29	3738.59	3738.49	3739.39	3739.09	3739.09	3740.09	3738.69	3738.19	3737.99
34	3726.57	3725.87	3726.27	3727.07	3727.47	3727.57	3728.27	3727.37	3728.57	3728.77	3727.57	3727.37
VALLEY MEAN...	3820.17	3820.07	3820.43	3821.34	3822.06	3823.08	3823.82	3824.80	3825.15	3824.94	3824.67	3824.47
NODE 1 MEAN...	3877.82	3877.66	3877.96	3878.76	3879.45	3880.37	3881.01	3882.01	3882.55	3882.56	3882.55	3882.32
NODE 2 MEAN...	3785.01	3784.95	3785.35	3786.32	3787.06	3788.14	3788.95	3789.91	3790.14	3789.79	3789.37	3789.19

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1959, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3914.62	3914.62	3914.72	3915.32	3915.52	3916.62	3917.82	3918.32	3918.22	3917.92	3917.82	3917.42
20	3918.79	3918.29	3918.89	3919.19	3919.29	3919.59	3919.79	3920.09	3919.59	3919.09	3918.79	3918.59
19	3912.74	3912.34	3912.74	3913.04	3912.94	3913.64	3914.24	3914.44	3914.04	3913.54	3913.24	3912.64
15	3895.61	3895.51	3895.91	3896.71	3896.51	3897.21	3897.21	3897.81	3897.41	3896.91	3896.61	3895.41
18	3891.65	3890.95	3890.45	3891.55	3891.85	3892.45	3894.15	3895.05	3895.55	3894.75	3894.65	3893.35
17	3889.71	3889.41	3889.41	3889.61	3889.81	3890.21	3890.91	3892.01	3892.51	3892.51	3892.61	3892.41
16	3883.23	3882.73	3882.83	3883.43	3883.33	3883.43	3883.73	3884.13	3883.73	3883.33	3883.13	3882.93
12	3880.49	3880.39	3880.59	3880.99	3881.29	3879.39	3880.99	3881.39	3880.19	3880.79	3878.79	3880.19
11	3872.89	3873.19	3875.59	3875.09	3875.19	3876.09	3875.99	3875.79	3874.79	3873.89	3873.39	3873.39
13	3848.16	3848.06	3848.16	3848.66	3848.76	3849.56	3850.06	3850.66	3850.86	3850.96	3850.96	3850.86
14	3845.60	3845.50	3845.40	3846.60	3847.10	3847.20	3848.10	3848.60	3849.10	3848.90	3848.70	3848.60
10	3838.95	3838.85	3838.95	3839.25	3839.35	3839.95	3840.35	3840.95	3841.25	3840.95	3840.65	3840.45
9	3835.98	3835.78	3836.08	3836.68	3836.88	3837.38	3837.48	3837.78	3838.18	3837.58	3836.98	3835.78
8	3837.70	3836.90	3838.10	3837.80	3837.70	3836.60	3839.70	3840.20	3839.90	3838.30	3837.50	3837.30
25	3826.54	3825.64	3826.54	3827.24	3827.14	3828.54	3829.04	3828.84	3828.74	3826.14	3825.64	3825.34
7	3831.97	3831.77	3832.17	3832.67	3832.87	3833.27	3833.67	3834.07	3833.87	3833.27	3832.67	3832.17
6	3817.35	3817.15	3817.55	3817.65	3817.75	3818.05	3818.35	3818.65	3818.75	3818.05	3817.85	3817.55
5	3810.38	3808.78	3809.08	3809.58	3809.78	3809.88	3809.78	3810.18	3809.98	3809.38	3809.08	3808.88
24	3811.51	3811.31	3810.81	3811.61	3811.51	3812.11	3812.11	3812.01	3811.71	3810.81	3810.31	3810.01
4	3805.16	3804.86	3805.16	3805.36	3805.26	3805.46	3805.16	3805.16	3804.96	3804.56	3804.46	3804.26
27	3805.06	3804.56	3805.76	3806.46	3806.56	3808.06	3808.86	3807.86	3806.86	3805.26	3804.56	3804.36
21	3802.48	3802.38	3802.48	3802.18	3802.28	3802.28	3802.58	3802.68	3802.28	3801.58	3801.38	3801.28
23	3797.80	3796.80	3798.50	3798.80	3799.00	3799.20	3799.40	3799.40	3798.70	3797.40	3796.90	3796.80
22	3797.08	3796.18	3797.48	3797.28	3797.18	3798.28	3798.38	3797.88	3797.18	3796.38	3796.08	3795.88
3	3803.51	3803.31	3803.81	3804.01	3804.21	3804.31	3803.31	3803.41	3803.01	3802.51	3802.41	3802.31
28	3798.25	3797.95	3797.65	3797.75	3797.85	3797.95	3797.95	3797.65	3797.55	3796.95	3796.75	3796.55
32	3785.78	3785.38	3786.58	3788.38	3788.48	3789.68	3790.08	3788.58	3788.48	3786.98	3786.38	3786.08
31	3786.05	3785.15	3785.85	3786.85	3786.75	3786.95	3788.35	3787.15	3787.25	3786.05	3785.55	3785.55
30	3788.96	3788.26	3788.16	3788.76	3788.66	3789.16	3789.66	3789.26	3788.96	3788.36	3787.96	3787.86
39	3781.43	3780.53	3781.03	3781.83	3781.93	3782.03	3782.83	3782.33	3781.43	3780.43	3780.13	3779.93
29	3780.04	3779.94	3780.24	3780.74	3780.64	3781.04	3781.44	3781.54	3781.34	3780.64	3780.24	3779.94
38	3770.84	3770.24	3772.34	3772.74	3772.84	3773.54	3774.54	3774.24	3773.34	3771.74	3771.14	3770.94
1	3760.40	3760.40	3760.70	3760.90	3761.10	3760.90	3761.20	3761.50	3761.20	3760.90	3760.60	3760.50
2	3759.68	3759.78	3760.78	3760.68	3760.78	3761.58	3762.48	3762.78	3762.68	3762.28	3761.98	3762.08
37	3748.22	3748.12	3749.42	3750.12	3750.02	3749.72	3749.92	3750.32	3749.82	3748.82	3748.52	3747.22
36	3747.95	3747.85	3749.75	3750.05	3749.85	3750.75	3750.45	3750.55	3749.65	3748.45	3747.85	3747.25
35	3739.97	3739.97	3741.17	3741.07	3740.97	3741.27	3741.47	3741.67	3740.57	3739.97	3739.97	3739.97
33	3737.79	3737.69	3739.49	3738.79	3738.99	3739.49	3739.39	3739.09	3738.59	3737.79	3737.49	3737.49
34	3725.87	3727.47	3728.47	3728.57	3728.67	3727.17	3727.97	3727.97	3727.27	3726.97	3727.27	3727.37
VALLEY MEAN...	3824.28	3823.97	3824.53	3824.95	3825.03	3825.39	3825.89	3826.10	3825.86	3825.19	3824.89	3824.68
NODE 1 MEAN...	3882.12	3881.88	3882.05	3882.52	3882.65	3883.12	3883.77	3884.34	3884.38	3884.15	3883.96	3883.82
NODE 2 MEAN...	3789.00	3788.65	3789.46	3789.84	3789.89	3790.19	3790.60	3790.59	3790.17	3789.23	3788.87	3788.62

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1960. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3917.02	3916.82	3916.82	3917.62	3917.82	3918.42	3918.72	3919.62	3919.62	3919.22	3919.02	3918.62
20	3918.39	3918.49	3918.49	3918.99	3918.89	3919.29	3919.59	3919.79	3919.69	3919.89	3919.29	3918.99
19	3912.54	3912.44	3912.14	3913.34	3913.44	3913.94	3913.94	3916.64	3914.84	3914.34	3913.84	3913.44
15	3896.21	3896.11	3896.61	3897.41	3897.81	3897.71	3897.81	3897.91	3897.61	3897.11	3896.81	3896.61
18	3894.15	3893.65	3893.35	3894.65	3895.15	3896.05	3896.85	3897.45	3897.55	3897.05	3896.65	3896.35
17	3892.21	3892.01	3892.01	3892.91	3893.11	3893.41	3894.01	3894.91	3894.61	3895.21	3895.11	3894.91
16	3882.93	3882.93	3883.03	3883.63	3883.73	3883.43	3883.53	3883.93	3883.93	3883.53	3883.23	3883.33
12	3880.19	3880.29	3880.49	3879.89	3881.19	3881.29	3881.39	3881.49	3881.19	3880.59	3880.69	3880.49
11	3873.69	3873.49	3875.59	3875.39	3875.39	3876.19	3875.49	3876.09	3874.99	3873.79	3873.89	3873.99
13	3850.56	3850.26	3850.66	3852.26	3852.46	3853.26	3852.96	3853.66	3854.46	3853.46	3852.86	3852.66
14	3848.60	3848.40	3848.50	3849.60	3849.60	3849.90	3850.30	3850.80	3850.90	3850.40	3850.20	3849.90
10	3840.35	3840.05	3840.55	3840.75	3840.95	3841.25	3841.55	3841.75	3841.75	3841.65	3841.15	3840.85
9	3836.58	3836.38	3836.98	3836.98	3837.48	3837.48	3837.48	3837.78	3837.68	3837.38	3837.08	3836.78
8	3837.40	3837.20	3837.40	3837.40	3837.30	3838.50	3839.90	3840.70	3839.20	3838.60	3838.00	3837.70
25	3824.94	3824.74	3825.94	3826.64	3827.44	3829.04	3828.44	3829.84	3828.24	3827.64	3826.34	3825.64
7	3831.97	3832.87	3832.37	3832.97	3833.17	3833.47	3833.67	3833.97	3833.97	3833.57	3832.97	3832.67
6	3817.35	3817.15	3817.15	3817.75	3818.05	3818.35	3819.35	3819.55	3819.45	3819.05	3818.55	3818.25
5	3808.60	3808.68	3808.88	3809.38	3809.58	3809.78	3810.18	3810.08	3810.38	3809.98	3809.08	3809.38
24	3809.91	3809.91	3810.31	3811.11	3811.41	3811.81	3811.81	3812.01	3811.91	3811.01	3810.51	3810.51
4	3804.16	3804.06	3804.16	3804.56	3804.56	3804.46	3805.16	3805.46	3805.26	3804.86	3804.66	3804.56
27	3804.16	3804.16	3805.36	3806.26	3807.66	3808.56	3807.96	3809.46	3807.66	3805.86	3804.96	3804.66
21	3801.08	3801.08	3801.58	3801.78	3801.98	3801.98	3802.48	3803.08	3802.68	3801.98	3801.58	3801.28
23	3796.60	3796.60	3797.50	3798.50	3798.80	3799.50	3799.50	3799.50	3798.50	3797.70	3797.20	3797.00
22	3795.68	3795.58	3795.78	3796.88	3796.89	3796.78	3796.88	3797.58	3797.98	3796.78	3796.18	3795.88
3	3802.21	3802.21	3802.31	3804.81	3802.61	3803.11	3803.01	3803.21	3803.11	3802.71	3802.61	3802.51
28	3796.45	3796.55	3796.65	3797.35	3797.45	3797.45	3797.65	3798.15	3797.65	3797.25	3796.85	3796.75
32	3785.68	3785.58	3786.08	3787.08	3787.18	3788.58	3789.98	3789.18	3788.18	3787.18	3786.58	3786.18
31	3785.45	3784.95	3785.15	3786.35	3786.05	3786.95	3787.35	3787.85	3786.95	3786.15	3786.05	3785.75
30	3787.66	3787.86	3788.16	3788.76	3788.86	3788.86	3789.16	3789.96	3789.36	3788.86	3788.46	3788.26
29	3779.93	3779.63	3780.13	3781.03	3781.13	3780.83	3781.73	3782.13	3781.33	3780.63	3780.23	3779.93
39	3779.84	3779.74	3779.94	3781.04	3781.04	3781.14	3781.44	3781.44	3781.24	3780.64	3780.24	3779.94
38	3770.74	3770.64	3772.14	3773.24	3773.04	3773.44	3773.64	3774.04	3772.84	3771.54	3770.94	3770.64
1	3760.50	3760.50	3760.70	3761.10	3761.10	3760.30	3760.60	3760.80	3760.70	3760.30	3760.10	3760.00
2	3762.18	3761.78	3762.98	3762.58	3762.88	3763.58	3763.28	3763.88	3763.78	3763.08	3762.68	3762.48
37	3748.22	3747.62	3748.22	3748.12	3748.02	3748.22	3748.42	3748.42	3748.02	3747.52	3747.32	3747.22
36	3746.85	3746.65	3747.75	3748.45	3748.55	3748.95	3749.15	3749.25	3748.25	3747.65	3747.25	3746.95
35	3740.17	3739.77	3741.07	3741.27	3741.27	3741.47	3741.27	3742.07	3740.67	3740.17	3740.27	3740.37
33	3737.49	3737.49	3738.49	3738.89	3738.59	3739.09	3739.09	3739.39	3738.59	3737.99	3737.69	3737.59
34	3727.57	3727.47	3727.77	3728.87	3728.47	3728.67	3728.97	3728.57	3728.47	3727.97	3727.77	3727.67
VALLEY MEAN...	3824,57	3824,42	3824,82	3825,57	3825,72	3826,07	3826,36	3826,83	3826,47	3825,93	3825,52	3825,29
NODE 1 MEAN...	3883,65	3883,45	3883,64	3884,55	3884,79	3885,27	3885,43	3886,13	3886,09	3885,71	3885,36	3885,14
NODE 2 MEAN...	3788,53	3788,43	3788,95	3789,60	3789,69	3789,97	3790,34	3790,67	3790,12	3789,47	3789,03	3788,79

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1961. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.12	3917.92	3917.72	3917.82	3917.52	3917.92	3918.52	3919.22	3919.52	3919.02	3918.62	3918.32
20	3918.69	3918.79	3918.69	3919.69	3918.59	3918.79	3919.09	3919.99	3919.69	3919.09	3919.09	3918.79
19	3913.04	3912.94	3912.74	3912.84	3912.94	3913.44	3913.54	3913.84	3913.84	3912.94	3913.04	3912.84
15	3896.51	3896.41	3896.61	3897.21	3897.21	3897.41	3897.81	3897.81	3897.71	3897.11	3896.81	3896.71
18	3895.65	3895.15	3894.55	3895.25	3894.35	3895.85	3896.45	3896.45	3896.65	3895.45	3895.65	3895.55
17	3894.41	3894.01	3894.51	3894.41	3894.11	3894.21	3894.41	3894.91	3894.91	3894.91	3894.51	3894.21
16	3883.33	3883.33	3883.33	3883.63	3883.33	3883.43	3882.63	3882.83	3883.33	3883.13	3883.33	3883.33
12	3880.39	3880.39	3877.19	3880.49	3878.19	3880.09	3878.69	3880.29	3880.79	3880.49	3880.49	3880.49
11	3873.99	3873.59	3875.59	3875.19	3874.79	3875.19	3875.39	3875.19	3874.69	3873.89	3874.09	3874.09
13	3852.06	3851.76	3849.96	3851.76	3851.86	3851.56	3851.46	3852.36	3851.86	3851.76	3850.96	3850.96
14	3849.70	3849.50	3849.80	3850.60	3850.20	3850.20	3850.10	3850.50	3850.80	3850.30	3850.10	3849.80
10	3840.55	3840.45	3840.55	3840.55	3840.85	3840.85	3840.65	3841.05	3841.25	3841.15	3841.05	3840.75
9	3836.58	3836.28	3835.98	3836.68	3836.28	3836.38	3837.08	3837.48	3837.88	3837.18	3837.28	3836.96
8	3837.60	3837.50	3836.80	3837.90	3838.50	3839.00	3840.00	3838.60	3838.60	3837.10	3836.90	3837.00
25	3824.84	3824.54	3825.24	3825.84	3825.54	3826.94	3827.04	3827.84	3827.84	3826.14	3825.24	3824.74
7	3832.37	3832.17	3832.37	3833.37	3832.97	3833.67	3833.57	3833.47	3833.47	3832.77	3832.37	3832.07
6	3817.85	3817.65	3817.25	3817.45	3817.35	3817.45	3818.25	3818.25	3818.45	3817.95	3817.65	3817.45
5	3809.18	3808.88	3808.58	3809.28	3809.88	3809.28	3809.58	3808.38	3809.68	3808.88	3809.08	3809.08
24	3810.11	3809.91	3810.31	3811.31	3811.51	3811.81	3811.91	3812.01	3811.71	3810.81	3810.31	3810.11
4	3804.46	3804.26	3804.16	3804.26	3804.06	3804.36	3804.36	3804.66	3804.96	3804.66	3804.56	3804.46
27	3804.36	3804.26	3805.26	3806.56	3806.76	3807.56	3807.96	3807.76	3807.16	3805.26	3804.46	3804.06
21	3801.08	3800.98	3801.48	3801.78	3801.68	3802.08	3802.48	3802.48	3802.48	3801.78	3800.46	3801.28
23	3796.80	3796.70	3796.00	3797.80	3798.30	3799.20	3799.00	3798.90	3798.10	3797.40	3797.00	3796.80
22	3795.68	3795.58	3795.58	3796.98	3795.78	3797.08	3796.88	3796.88	3796.78	3796.38	3796.08	3795.88
3	3802.41	3802.31	3802.41	3802.71	3802.31	3802.41	3802.81	3802.81	3802.91	3802.71	3802.61	3802.51
28	3796.65	3796.55	3796.85	3797.35	3797.25	3797.65	3797.85	3798.25	3797.85	3797.35	3797.05	3796.95
32	3785.98	3785.78	3786.98	3787.28	3786.78	3788.18	3785.88	3788.38	3788.28	3786.78	3786.48	3786.18
31	3785.15	3785.05	3785.85	3786.15	3785.75	3787.25	3788.55	3787.15	3787.35	3786.35	3786.35	3785.65
30	3788.06	3787.96	3788.16	3788.46	3788.66	3788.96	3789.56	3789.86	3789.46	3788.86	3788.46	3788.26
39	3779.93	3779.73	3779.63	3780.03	3780.23	3780.03	3780.93	3780.93	3782.13	3780.33	3780.03	3779.93
29	3779.84	3779.64	3779.54	3780.34	3780.04	3760.54	3780.74	3780.84	3781.24	3780.44	3779.94	3779.74
38	3770.44	3770.24	3767.54	3769.64	3770.94	3772.54	3773.54	3773.44	3772.24	3771.64	3771.24	3771.24
1	3759.90	3759.80	3759.90	3760.30	3760.40	3760.50	3760.50	3760.50	3760.60	3760.10	3760.10	3760.10
2	3762.58	3762.38	3762.18	3762.28	3762.28	3763.58	3762.78	3763.88	3762.58	3762.58	3762.58	3762.38
37	3747.12	3746.62	3746.72	3747.62	3747.72	3747.62	3747.32	3747.22	3747.72	3747.32	3747.12	3747.12
36	3746.85	3746.65	3747.15	3747.65	3747.75	3748.15	3749.25	3748.75	3748.35	3747.05	3746.85	3746.75
35	3740.27	3740.17	3740.47	3741.07	3740.87	3740.67	3740.47	3739.77	3739.97	3738.47	3736.77	3736.97
33	3737.69	3737.39	3738.29	3738.39	3739.29	3738.49	3738.09	3737.49	3737.19	3736.79	3736.69	3736.79
34	3727.87	3727.67	3726.77	3728.67	3727.77	3728.57	3728.37	3728.37	3728.37	3727.77	3727.77	3727.77
VALLEY MEAN...	3825,02	3824,80	3824,50	3825,28	3825,20	3825,57	3825,77	3825,96	3825,95	3825,26	3825,01	3824,87
NODE 1 MEAN...	3884,73	3884,49	3884,00	3884,79	3884,52	3884,73	3884,81	3885,32	3885,25	3884,84	3884,61	3884,45
NODE 2 MEAN...	3788,60	3788,40	3788,22	3788,99	3789,03	3789,49	3789,77	3789,75	3789,79	3788,93	3788,65	3788,54

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1962, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.02	3917.92	3917.82	3918.72	3919.02	3919.52	3920.72	3921.12	3921.42	3920.42	3919.82	3919.42
20	3918.69	3918.59	3918.59	3919.59	3919.79	3919.79	3920.39	3920.49	3920.29	3920.09	3919.79	3919.59
19	3912.74	3912.74	3912.74	3913.74	3913.94	3914.04	3914.64	3914.44	3914.24	3913.74	3913.44	3913.24
15	3896.71	3896.51	3897.01	3897.51	3897.41	3897.71	3898.01	3898.01	3897.61	3897.21	3896.91	3896.81
18	3895.25	3894.55	3894.65	3895.75	3895.95	3896.95	3897.95	3897.25	3897.85	3897.25	3896.95	3896.65
17	3893.91	3893.61	3893.41	3894.71	3894.91	3895.21	3896.21	3896.21	3896.81	3896.41	3896.01	3895.81
16	3883.33	3883.33	3883.23	3883.83	3883.93	3883.83	3884.43	3884.23	3884.13	3884.03	3883.83	3883.53
12	3880.49	3880.39	3880.39	3881.19	3881.19	3881.59	3881.69	3881.79	3881.59	3881.19	3880.99	3880.89
11	3873.79	3873.69	3875.49	3875.59	3875.39	3875.89	3875.79	3876.19	3875.19	3874.89	3874.19	3874.59
13	3850.86	3850.66	3849.66	3851.26	3851.96	3853.16	3853.86	3854.16	3854.26	3853.66	3853.56	3853.06
14	3849.60	3849.40	3848.20	3850.60	3850.60	3850.60	3851.40	3852.00	3851.70	3851.30	3850.90	3850.70
10	3840.55	3840.95	3840.55	3841.35	3841.65	3841.75	3842.05	3842.05	3842.25	3842.35	3841.55	3841.35
9	3836.48	3836.08	3836.18	3836.98	3836.78	3837.28	3838.48	3838.48	3838.48	3837.88	3837.38	3837.18
8	3837.00	3838.00	3837.30	3837.60	3838.80	3839.70	3839.90	3838.80	3839.20	3838.80	3838.30	3838.10
25	3824.24	3824.14	3824.64	3826.34	3827.14	3828.44	3829.44	3829.24	3828.14	3827.24	3826.44	3826.14
7	3831.97	3831.77	3831.97	3832.77	3833.17	3833.67	3834.37	3834.37	3834.07	3833.77	3833.37	3833.07
6	3817.25	3817.15	3817.15	3817.95	3818.15	3818.45	3819.05	3819.35	3819.35	3820.25	3819.15	3818.65
5	3808.60	3808.78	3808.98	3809.68	3810.18	3810.38	3811.08	3811.08	3810.68	3810.38	3809.98	3809.78
24	3809.81	3809.91	3810.11	3811.31	3811.61	3811.91	3812.41	3812.41	3811.81	3811.31	3810.61	3810.51
4	3804.36	3804.26	3804.66	3804.96	3804.96	3805.26	3805.86	3806.06	3805.86	3805.66	3805.26	3805.16
27	3803.96	3803.86	3804.66	3806.26	3806.66	3807.86	3808.56	3808.36	3807.06	3805.66	3804.96	3804.56
21	3801.08	3800.98	3801.38	3801.88	3801.68	3801.78	3802.68	3802.68	3802.48	3801.78	3801.38	3801.18
23	3796.70	3796.90	3796.70	3799.00	3799.30	3799.50	3799.80	3799.70	3798.50	3797.80	3797.50	3797.20
22	3795.66	3795.68	3795.48	3796.28	3796.88	3798.08	3798.48	3798.28	3796.48	3795.58	3795.08	3794.88
3	3802.41	3802.31	3802.61	3803.01	3803.31	3803.21	3803.61	3803.81	3803.71	3803.31	3803.01	3802.91
2	3796.85	3796.75	3796.95	3798.05	3797.95	3798.15	3798.65	3798.65	3798.15	3797.55	3797.25	3797.05
28	3785.98	3785.78	3787.78	3787.68	3787.28	3787.58	3789.48	3789.98	3789.88	3788.48	3787.48	3786.88
32	3785.55	3785.45	3786.55	3786.65	3786.25	3786.35	3787.65	3787.55	3787.15	3786.95	3786.15	3785.65
31	3788.06	3788.06	3788.26	3789.26	3789.06	3789.16	3789.96	3789.76	3789.16	3788.56	3788.26	3788.06
30	3779.83	3779.73	3779.73	3780.43	3780.73	3781.33	3782.03	3782.03	3781.43	3780.63	3780.43	3780.23
39	3779.54	3779.34	3779.64	3780.44	3780.14	3779.94	3781.04	3781.34	3781.64	3780.94	3780.54	3780.24
29	3771.24	3770.64	3771.04	3772.74	3773.04	3774.44	3774.54	3774.24	3773.34	3772.04	3771.14	3770.94
38	3759.90	3759.80	3760.00	3759.70	3760.70	3760.70	3761.00	3760.90	3760.90	3760.60	3760.40	3760.30
1	3762.08	3762.18	3762.58	3762.28	3762.58	3763.18	3763.88	3764.38	3763.68	3763.28	3762.98	3762.88
37	3747.12	3747.32	3747.22	3747.92	3747.72	3748.02	3748.32	3748.72	3748.42	3747.82	3747.72	3747.52
36	3746.45	3746.45	3746.95	3747.95	3747.65	3748.45	3749.05	3749.85	3748.95	3747.95	3747.45	3747.25
35	3739.17	3739.17	3739.87	3740.47	3740.47	3740.87	3741.07	3741.27	3740.47	3740.37	3740.27	3740.07
33	3736.89	3736.59	3736.99	3737.29	3737.29	3737.99	3738.59	3737.99	3737.69	3737.19	3736.79	3736.69
34	3727.67	3727.67	3728.27	3728.67	3728.97	3728.87	3729.47	3729.27	3729.37	3728.57	3728.17	3728.07
VALLEY MEAN...	3824,71	3824,59	3824,65	3825,57	3825,84	3826,36	3826,98	3827,01	3826,80	3826,29	3825,87	3825,63
NODE 1 MEAN...	3884,28	3884,07	3883,83	3884,95	3885,22	3885,76	3886,44	3886,47	3886,57	3886,13	3885,84	3885,59
NODE 2 MEAN...	3788,38	3788,32	3788,57	3789,35	3789,63	3790,13	3790,72	3790,74	3790,35	3789,80	3789,30	3789,06

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1963. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3919.22	3918.82	3918.02	3919.42	3919.42	3919.32	3919.72	3920.12	3919.72	3919.12	3918.72	3918.62
20	3919.39	3919.19	3919.79	3919.69	3919.69	3919.49	3919.39	3919.49	3919.49	3919.39	3919.19	3918.99
19	3913.14	3912.64	3913.24	3913.84	3914.04	3913.74	3913.34	3913.54	3913.34	3913.24	3912.94	3912.74
15	3896.71	3896.61	3897.01	3897.31	3897.31	3897.21	3897.01	3897.51	3896.91	3896.51	3896.41	3896.31
18	3897.15	3895.45	3896.25	3896.95	3896.55	3896.35	3896.75	3896.45	3896.45	3896.05	3895.65	3895.55
17	3895.41	3894.91	3895.61	3896.11	3896.11	3896.11	3896.21	3894.61	3895.41	3895.21	3895.01	3894.71
16	3883.73	3883.63	3883.73	3884.03	3884.03	3883.33	3883.03	3883.63	3883.73	3883.63	3883.73	3883.83
12	3880.79	3880.49	3881.09	3881.19	3881.09	3881.09	3877.99	3880.89	3880.89	3880.79	3880.69	3880.89
11	3874.19	3873.99	3875.69	3875.19	3875.09	3875.09	3875.59	3875.09	3874.49	3873.99	3873.49	3873.19
13	3852.66	3852.16	3852.26	3853.46	3853.66	3851.86	3850.26	3850.56	3850.46	3850.46	3851.16	3850.86
14	3850.50	3850.20	3850.60	3851.20	3850.80	3850.70	3851.30	3851.40	3851.20	3850.80	3850.60	3850.40
10	3841.15	3841.05	3840.85	3841.35	3841.25	3840.95	3840.95	3841.15	3841.65	3841.05	3840.75	3840.55
9	3836.98	3836.58	3836.98	3836.88	3836.50	3836.68	3837.58	3837.18	3837.36	3836.78	3836.48	3836.28
8	3837.90	3837.50	3838.00	3838.00	3837.00	3838.20	3838.60	3838.50	3838.70	3837.20	3837.00	3837.10
25	3825.34	3824.64	3826.24	3826.34	3826.04	3826.84	3826.24	3827.04	3826.34	3824.84	3824.84	3825.04
7	3832.77	3832.57	3832.87	3833.37	3833.57	3833.57	3833.77	3833.97	3833.67	3833.17	3832.77	3832.57
6	3818.25	3817.95	3817.85	3818.25	3818.45	3818.15	3818.45	3817.45	3818.85	3818.05	3817.75	3817.55
5	3809.68	3809.38	3810.28	3809.98	3809.68	3809.98	3809.48	3809.08	3809.48	3809.18	3809.08	3808.98
24	3810.31	3810.11	3810.41	3811.31	3811.71	3811.81	3812.11	3812.01	3811.61	3810.71	3810.41	3810.41
4	3804.96	3804.66	3804.86	3804.86	3804.56	3804.66	3804.46	3804.56	3804.86	3804.66	3804.56	3804.46
27	3804.26	3804.26	3805.36	3805.96	3806.36	3807.06	3807.96	3808.56	3806.36	3804.66	3804.26	3804.16
21	3801.08	3800.98	3801.58	3801.58	3801.68	3801.58	3802.78	3802.88	3802.28	3801.48	3801.08	3800.98
23	3797.00	3796.70	3796.70	3797.60	3798.30	3798.40	3797.70	3798.20	3797.80	3797.10	3796.90	3796.70
22	3794.68	3794.58	3795.28	3795.08	3795.18	3795.38	3796.68	3796.18	3795.28	3794.88	3794.58	3794.48
3	3802.71	3802.61	3803.41	3803.01	3802.71	3802.81	3803.21	3802.91	3802.91	3802.61	3802.51	3802.51
28	3797.05	3796.95	3797.65	3797.85	3797.95	3797.65	3797.55	3798.65	3797.95	3797.35	3797.05	3796.95
32	3786.38	3786.08	3787.08	3787.78	3787.18	3786.88	3788.98	3787.58	3787.68	3786.68	3786.18	3785.88
31	3785.65	3785.15	3786.45	3786.45	3786.05	3785.75	3787.65	3786.35	3786.55	3785.95	3785.75	3785.55
30	3787.96	3787.76	3788.96	3788.56	3788.46	3788.96	3789.16	3789.16	3788.76	3788.16	3787.86	3787.76
39	3780.13	3780.03	3780.23	3780.63	3780.73	3780.33	3781.03	3781.43	3780.93	3780.43	3780.13	3780.13
29	3780.14	3779.84	3781.04	3780.83	3780.54	3780.74	3781.24	3781.54	3781.04	3780.34	3779.84	3779.74
38	3770.64	3770.54	3771.44	3772.24	3771.74	3772.44	3771.94	3771.64	3769.44	3770.84	3770.44	3770.34
1	3760.10	3759.90	3760.10	3760.30	3760.00	3760.00	3760.20	3760.20	3760.90	3760.40	3760.10	3760.00
2	3762.78	3762.58	3763.08	3762.38	3761.98	3761.48	3762.28	3761.98	3762.78	3762.58	3762.48	3762.28
37	3747.42	3747.32	3748.32	3748.02	3748.02	3747.82	3747.82	3747.82	3747.72	3747.42	3747.32	3747.32
36	3747.05	3746.85	3747.85	3748.45	3746.25	3748.25	3749.25	3748.85	3748.05	3747.25	3747.05	3747.05
35	3739.97	3739.57	3741.07	3740.87	3740.67	3740.97	3741.27	3741.07	3740.07	3739.67	3739.67	3739.77
33	3736.59	3736.59	3737.89	3737.59	3737.59	3738.04	3738.99	3737.69	3737.29	3736.69	3736.59	3736.49
34	3727.97	3727.87	3728.57	3729.17	3728.87	3728.77	3729.47	3728.67	3728.47	3727.67	3727.57	3727.67
VALLEY MEAN...	3825.42	3825.08	3825.65	3826.02	3825.92	3825.77	3825.78	3825.68	3825.53	3825.13	3825.00	3824.88
NODE 1 MEAN...	3885.42	3884.90	3885.32	3885.90	3885.88	3885.34	3884.91	3884.86	3884.90	3884.70	3884.72	3884.50
NODE 2 MEAN...	3788.83	3788.60	3789.26	3789.50	3789.35	3789.44	3789.72	3789.59	3789.31	3788.81	3788.56	3788.52

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1964. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.42	3918.02	3917.72	3917.32	3916.82	3916.12	3915.52	3915.02	3914.52	3914.22	3913.92	3913.92
20	3918.89	3918.59	3918.99	3917.59	3917.69	3916.59	3916.39	3915.49	3915.19	3915.69	3915.79	3915.89
19	3912.54	3912.34	3910.54	3911.14	3910.44	3910.04	3909.74	3909.04	3909.24	3909.54	3909.54	3909.44
15	3896.31	3895.21	3895.41	3895.91	3895.41	3895.01	3894.71	3894.51	3894.71	3894.21	3893.91	3893.81
18	3895.25	3894.55	3893.45	3893.05	3891.95	3891.95	3891.25	3889.95	3890.25	3889.85	3890.05	3890.15
17	3894.41	3894.11	3891.01	3893.21	3892.31	3891.71	3891.01	3889.91	3889.61	3889.41	3889.21	3889.21
16	3883.93	3883.53	3882.03	3882.13	3881.63	3880.13	3879.23	3878.53	3879.33	3879.93	3880.63	3880.93
12	3880.99	3880.89	3880.29	3879.59	3879.39	3878.59	3877.09	3874.99	3877.39	3878.69	3879.29	3879.49
11	3873.29	3873.09	3873.09	3873.99	3873.09	3873.39	3874.19	3872.89	3873.49	3872.69	3872.69	3872.89
13	3850.56	3850.56	3848.06	3847.26	3846.76	3845.66	3843.96	3842.36	3843.06	3842.96	3844.36	3844.56
14	3850.10	3849.90	3849.50	3849.40	3848.80	3848.00	3847.40	3847.20	3846.40	3845.90	3845.20	3845.00
10	3840.35	3840.15	3840.45	3839.75	3839.25	3839.25	3838.35	3837.45	3836.95	3836.65	3836.65	3836.85
9	3836.08	3835.58	3833.78	3834.58	3834.28	3834.48	3833.08	3833.28	3833.48	3833.38	3833.28	3833.18
8	3837.70	3837.30	3835.30	3833.30	3835.10	3834.90	3834.60	3833.10	3836.10	3835.80	3835.80	3835.80
25	3824.24	3824.14	3824.44	3823.34	3822.44	3821.94	3820.44	3820.24	3820.64	3820.94	3821.34	3821.54
7	3833.27	3832.17	3831.97	3832.47	3831.87	3831.77	3831.67	3831.27	3831.17	3830.67	3830.37	3830.27
6	3817.35	3817.25	3817.05	3816.65	3816.25	3815.75	3815.05	3814.15	3813.45	3813.05	3813.05	3813.15
5	3808.88	3808.38	3807.88	3807.58	3806.88	3806.78	3805.58	3804.48	3804.28	3804.68	3805.08	3805.28
24	3810.11	3810.01	3809.11	3810.01	3809.61	3809.21	3809.21	3809.11	3810.01	3809.71	3809.51	3809.51
4	3804.46	3804.06	3803.76	3803.06	3802.76	3802.46	3801.86	3801.06	3800.76	3801.06	3801.36	3801.56
27	3803.86	3803.76	3804.46	3804.46	3803.86	3803.86	3804.16	3803.96	3803.96	3803.36	3802.96	3802.96
21	3800.88	3800.78	3800.28	3800.58	3800.38	3799.78	3799.68	3799.28	3799.68	3799.78	3799.78	3799.88
23	3796.60	3796.60	3795.40	3795.00	3794.90	3794.00	3792.20	3791.20	3792.20	3793.40	3794.10	3794.40
22	3794.38	3794.08	3793.78	3794.48	3793.48	3793.28	3793.58	3793.08	3793.38	3792.98	3793.18	3793.28
3	3802.31	3802.11	3801.31	3801.31	3801.21	3800.61	3800.11	3799.21	3799.21	3799.41	3799.81	3800.01
28	3796.85	3796.75	3796.75	3797.25	3797.05	3797.05	3796.75	3797.05	3796.65	3796.35	3796.25	3796.15
32	3785.68	3785.58	3785.18	3785.48	3785.08	3784.78	3783.78	3783.48	3783.18	3782.98	3782.88	3782.98
31	3785.15	3785.05	3785.45	3785.55	3785.15	3785.15	3784.95	3784.55	3784.05	3783.75	3783.55	3783.45
30	3787.66	3787.56	3787.46	3788.16	3787.46	3787.06	3786.96	3786.86	3786.86	3786.66	3786.66	3786.66
29	3780.03	3779.83	3778.53	3778.63	3778.83	3777.63	3776.83	3776.43	3776.13	3776.53	3776.93	3777.13
39	3779.64	3779.44	3780.04	3780.24	3779.64	3780.44	3780.54	3780.04	3779.44	3778.94	3778.64	3778.44
38	3770.24	3770.04	3768.34	3767.94	3765.84	3765.74	3765.64	3766.44	3766.24	3766.04	3766.14	3766.34
1	3760.00	3759.80	3759.70	3759.90	3758.70	3758.40	3756.20	3755.30	3753.80	3754.60	3755.00	3755.40
2	3761.98	3761.58	3759.88	3759.98	3759.60	3758.88	3757.68	3756.78	3756.58	3756.88	3757.16	3757.38
37	3747.32	3747.22	3746.92	3745.72	3745.62	3745.72	3743.92	3743.92	3743.72	3744.12	3744.62	3744.82
36	3746.85	3746.65	3745.65	3745.35	3745.25	3745.45	3744.65	3743.75	3743.25	3743.35	3743.55	3743.75
35	3739.77	3739.67	3739.57	3739.67	3739.17	3738.97	3738.77	3739.17	3738.67	3737.67	3737.57	3737.37
33	3736.49	3736.39	3736.09	3736.89	3736.19	3735.79	3735.39	3734.89	3734.69	3735.09	3735.29	3735.59
34	3727.67	3727.57	3727.77	3728.07	3727.47	3727.47	3727.47	3727.37	3727.17	3726.77	3726.87	3726.77
VALLEY MEAN...	3824,75	3824,50	3823,57	3823,48	3822,96	3822,54	3821,77	3821,09	3821,12	3821,11	3821,35	3821,45
NODE 1 MEAN...	3884,30	3884,03	3882,58	3882,62	3882,04	3881,43	3880,60	3879,56	3879,80	3879,73	3880,07	3880,15
NODE 2 MEAN...	3788,42	3788,19	3787,58	3787,41	3786,94	3786,63	3785,89	3785,43	3785,33	3785,36	3785,53	3785,66

(Continued)

TABLE A6. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1965, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3913.82	3913.72	3913.72	3913.12	3912.72	3912.52	3913.32	3914.22	3914.22	3913.92	3913.87	3913.97
20	3915.59	3915.69	3915.59	3914.19	3914.59	3913.49	3913.79	3915.09	3916.39	3915.99	3916.39	3916.39
19	3909.74	3908.84	3908.94	3907.74	3907.64	3908.04	3908.54	3909.74	3909.74	3910.34	3910.24	3910.14
15	3893.61	3893.31	3893.21	3893.91	3893.51	3894.21	3894.91	3895.81	3896.01	3895.51	3895.31	3895.31
18	3890.25	3890.05	3890.05	3888.05	3888.25	3888.05	3888.45	3889.65	3890.15	3890.25	3890.25	3890.45
17	3889.31	3889.11	3889.21	3888.21	3887.01	3887.91	3888.51	3888.91	3889.01	3889.31	3889.11	3889.01
16	3881.13	3881.23	3880.83	3878.53	3878.23	3877.63	3878.33	3879.43	3880.93	3881.13	3881.83	3882.03
12	3879.49	3879.49	3879.49	3876.79	3877.39	3875.99	3875.69	3879.29	3879.99	3879.99	3880.09	3880.09
13	3872.79	3873.09	3872.79	3873.69	3872.99	3874.69	3875.29	3875.59	3875.19	3874.09	3873.79	3873.79
11	3844.66	3844.66	3843.46	3841.16	3841.16	3840.66	3840.26	3843.16	3843.26	3843.16	3844.26	3844.56
14	3844.80	3844.50	3844.40	3844.00	3843.40	3842.90	3842.90	3843.70	3844.40	3844.30	3844.20	3844.10
10	3836.05	3836.65	3836.65	3836.15	3835.75	3835.95	3935.45	3835.95	3836.35	3836.55	3836.75	3836.85
9	3833.18	3832.38	3832.58	3831.48	3831.68	3831.08	3831.08	3832.28	3832.88	3833.08	3833.18	3833.28
8	3835.70	3835.60	3832.40	3835.00	3834.80	3834.50	3836.00	3837.90	3839.60	3838.40	3837.70	3837.50
25	3821.14	3821.64	3821.54	3820.54	3820.14	3820.34	3820.64	3822.84	3824.84	3823.04	3823.04	3823.04
7	3830.17	3830.97	3830.07	3830.37	3830.17	3830.37	3831.57	3831.87	3832.67	3831.97	3831.57	3831.37
6	3813.45	3813.65	3813.75	3813.25	3812.75	3812.25	3811.95	3811.95	3813.05	3814.65	3815.35	3815.55
5	3805.58	3805.38	3804.78	3804.18	3803.48	3803.28	3803.08	3803.78	3806.28	3806.88	3807.48	3807.68
24	3809.41	3809.51	3809.41	3809.01	3808.91	3809.51	3810.71	3811.51	3814.01	3811.71	3810.91	3810.61
4	3801.76	3801.86	3801.56	3800.66	3800.36	3800.36	3800.86	3801.46	3802.06	3802.56	3802.96	3803.16
27	3800.46	3800.96	3800.86	3799.76	3799.46	3799.66	3799.96	3802.16	3804.16	3802.26	3802.36	3802.36
3	3799.98	3799.88	3799.88	3799.38	3799.48	3799.98	3800.08	3800.88	3801.58	3800.78	3800.68	3800.68
21	3794.70	3794.80	3794.70	3792.40	3792.40	3793.60	3794.60	3796.53	3797.80	3796.90	3796.60	3796.70
22	3793.28	3793.28	3793.18	3792.78	3792.68	3793.38	3794.08	3795.38	3795.38	3794.38	3794.38	3794.38
23	3800.31	3800.21	3799.71	3798.91	3798.71	3799.31	3799.61	3800.31	3801.11	3801.41	3801.61	3801.81
2	3796.05	3796.05	3795.15	3796.85	3796.45	3796.35	3797.05	3797.45	3797.45	3796.95	3796.75	3796.75
28	3782.98	3782.98	3783.28	3782.98	3782.68	3782.58	3783.48	3783.79	3783.78	3784.28	3784.28	3784.28
32	3783.45	3783.45	3783.65	3783.75	3783.75	3783.55	3784.35	3784.55	3784.75	3784.45	3784.35	3784.25
31	3786.66	3786.66	3786.66	3786.76	3786.66	3786.86	3787.36	3787.96	3787.96	3787.56	3787.46	3787.46
30	3777.33	3777.23	3776.83	3775.23	3775.13	3775.13	3776.33	3779.63	3781.03	3780.33	3780.23	3780.13
39	3778.24	3778.24	3778.24	3778.64	3778.04	3777.74	3777.94	3778.54	3778.54	3778.44	3778.34	3778.24
29	3766.44	3766.44	3765.74	3764.34	3763.84	3764.94	3766.84	3768.14	3768.34	3767.84	3767.64	3767.74
38	3755.80	3755.60	3755.50	3753.60	3753.70	3753.70	3753.80	3754.60	3755.20	3755.20	3755.70	3756.00
1	3757.58	3757.38	3756.58	3756.18	3755.98	3756.08	3756.48	3756.78	3757.08	3757.18	3757.36	3757.58
37	3745.02	3745.22	3744.32	3742.62	3742.92	3743.82	3744.62	3745.52	3746.12	3746.42	3746.52	3746.62
36	3743.95	3744.15	3744.45	3743.25	3742.95	3744.05	3744.75	3746.05	3746.25	3745.95	3745.75	3745.85
35	3737.37	3737.17	3737.17	3738.57	3737.57	3739.37	3739.87	3740.27	3739.67	3738.87	3738.67	3738.77
33	3735.79	3735.79	3735.59	3734.69	3734.99	3735.69	3737.39	3737.39	3737.09	3736.29	3736.09	3736.19
34	3727.07	3727.17	3727.27	3727.77	3727.37	3727.37	3728.17	3728.17	3728.17	3727.17	3727.37	3727.47
VALLEY MEAN...	3821,49	3821,46	3871,12	3820,21	3819,97	3820,11	3870,59	3821,82	3822,45	3822,23	3822,35	3822,42
NODE 1 MEAN...	3880,15	3880,03	3879,72	3878,38	3878,16	3878,08	3878,25	3879,68	3880,00	3879,99	3880,27	3880,35
NODE 2 MEAN...	3785,72	3785,74	3785,39	3784,74	3784,48	3784,76	3785,44	3786,54	3787,35	3787,00	3787,03	3787,08

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1966, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3913.82	3913.82	3913.52	3914.22	3914.62	3915.02	3916.02	3916.72	3917.32	3917.42	3917.12	3917.02
20	3916.50	3916.09	3915.29	3916.09	3916.89	3917.19	3918.09	3919.59	3919.79	3919.89	3919.59	3919.39
19	3909.74	3909.74	3909.84	3910.84	3911.54	3912.34	3913.14	3914.84	3914.24	3914.04	3913.54	3913.34
15	3895.31	3895.31	3895.51	3897.01	3896.41	3896.51	3896.61	3896.91	3896.81	3896.41	3896.21	3896.21
18	3890.35	3890.25	3891.95	3890.55	3890.75	3891.35	3892.35	3892.95	3893.25	3893.05	3892.85	3892.75
17	3888.81	3888.81	3889.11	3889.51	3889.81	3890.91	3890.21	3890.91	3891.31	3891.41	3891.31	3891.21
16	3882.23	3882.33	3881.73	3882.13	3882.33	3882.53	3882.73	3884.23	3883.73	3883.53	3883.33	3883.23
12	3880.29	3880.29	3879.59	3880.39	3880.29	3880.29	3880.69	3881.19	3881.39	3881.09	3881.09	3881.19
11	3873.79	3873.49	3873.49	3875.29	3875.39	3876.09	3876.19	3876.19	3875.49	3874.69	3874.79	3874.49
13	3844.76	3843.46	3843.96	3844.96	3845.36	3846.26	3847.46	3848.76	3849.36	3849.88	3849.66	3849.36
14	3843.90	3843.90	3843.40	3844.30	3844.10	3844.30	3845.30	3846.20	3846.70	3847.10	3847.10	3846.80
10	3836.75	3836.75	3836.55	3836.85	3837.45	3837.85	3838.35	3839.05	3839.25	3840.25	3839.85	3839.45
9	3832.68	3833.08	3833.08	3833.88	3834.38	3835.08	3836.28	3836.78	3836.98	3836.68	3836.36	3835.88
8	3837.30	3835.50	3837.10	3839.20	3838.80	3838.80	3839.80	3840.40	3840.60	3839.40	3838.70	3838.20
25	3823.04	3823.04	3823.54	3825.44	3826.34	3827.34	3827.24	3828.14	3825.74	3825.74	3825.24	3824.54
7	3831.27	3831.27	3831.37	3833.17	3832.97	3833.17	3833.17	3833.47	3833.47	3832.87	3832.57	3832.47
6	3815.85	3816.15	3815.75	3816.05	3816.65	3817.25	3817.95	3818.45	3818.85	3818.85	3818.35	3817.85
5	3806.98	3807.78	3807.88	3808.78	3807.98	3809.38	3809.88	3810.28	3811.08	3810.58	3810.08	3809.36
24	3810.31	3810.31	3810.61	3810.61	3811.71	3812.01	3812.71	3812.71	3812.61	3811.21	3810.71	3810.51
4	3803.36	3803.36	3803.06	3803.96	3804.36	3804.86	3805.86	3806.46	3806.66	3805.96	3805.66	3805.46
27	3793.76	3803.86	3804.26	3807.06	3807.76	3808.56	3808.16	3809.06	3808.16	3805.46	3804.56	3804.26
21	3800.48	3800.58	3800.78	3801.28	3801.38	3801.78	3802.68	3802.98	3802.58	3801.78	3801.48	3801.08
23	3798.00	3798.20	3798.20	3798.90	3799.40	3799.50	3800.60	3800.80	3801.00	3800.20	3800.40	3800.20
22	3792.28	3792.18	3792.08	3793.68	3792.98	3793.98	3795.48	3795.08	3793.18	3793.18	3792.78	3792.66
3	3801.41	3801.71	3801.81	3803.21	3803.01	3803.51	3804.21	3804.71	3804.81	3803.21	3803.11	3802.41
28	3796.65	3796.85	3796.85	3797.45	3797.55	3797.75	3798.25	3798.84	3798.65	3797.95	3797.75	3797.35
32	3787.58	3787.58	3787.58	3788.38	3788.48	3790.08	3789.98	3789.98	3788.78	3789.28	3788.98	3788.68
31	3782.35	3782.55	3783.05	3783.45	3783.85	3784.35	3786.15	3786.25	3786.85	3786.05	3785.45	3785.15
30	3785.66	3785.86	3785.76	3786.66	3786.86	3787.46	3788.26	3788.86	3789.26	3788.88	3788.46	3788.26
39	3780.13	3780.03	3780.33	3781.43	3781.83	3782.53	3782.93	3783.43	3782.93	3783.03	3781.23	3780.93
29	3778.24	3778.34	3778.54	3778.84	3779.14	3779.54	3780.44	3781.04	3780.94	3780.44	3780.24	3779.94
38	3767.74	3767.54	3768.14	3770.04	3770.74	3772.34	3772.54	3774.34	3773.54	3772.14	3771.44	3770.94
1	3756.30	3756.50	3756.10	3756.30	3759.70	3760.10	3760.50	3761.20	3761.10	3760.60	3760.50	3760.50
2	3757.58	3757.98	3757.88	3758.38	3756.78	3759.18	3759.88	3761.38	3761.78	3760.88	3761.28	3760.98
37	3746.82	3746.92	3746.92	3747.32	3747.42	3747.32	3747.72	3748.52	3748.62	3748.02	3747.82	3747.62
36	3745.95	3745.96	3746.35	3747.45	3747.55	3747.65	3748.25	3749.05	3748.65	3747.35	3747.05	3746.95
35	3738.87	3736.97	3737.07	3737.47	3737.57	3737.77	3737.97	3738.37	3739.97	3737.27	3737.17	3736.97
33	3737.89	3737.99	3738.79	3739.39	3738.79	3739.79	3739.69	3740.39	3739.79	3738.69	3739.69	3738.69
34	3727.57	3727.67	3727.77	3728.47	3728.17	3730.07	3728.47	3730.57	3729.97	3728.47	3728.27	3728.17
VALLEY MEAN...	3822,35	3822,30	3822,51	3823,33	3823,71	3824,37	3824,86	3825,65	3825,59	3825,18	3824,84	3824,55
NODE 1 MEAN...	3880,33	3879,96	3880,20	3880,74	3881,04	3881,68	3882,26	3883,18	3883,41	3883,50	3883,31	3883,12
NODE 2 MEAN...	3786,99	3787,13	3787,33	3788,33	3788,75	3789,42	3789,85	3790,57	3790,33	3789,61	3789,16	3788,92

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1967, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3916.97	3916.42	3916.52	3916.12	3915.82	3915.52	3915.62	3915.52	3916.02	3915.72	3915.82	3915.82
20	3919.09	3917.79	3917.69	3917.29	3917.39	3916.89	3916.39	3915.69	3917.69	3918.79	3918.59	3918.39
19	3912.94	3912.44	3911.74	3912.14	3911.84	3912.04	3911.84	3912.14	3912.64	3912.24	3912.04	3911.94
15	3896.11	3895.81	3896.21	3896.31	3895.91	3896.21	3895.81	3895.71	3895.91	3895.81	3895.71	3895.71
18	3892.35	3891.95	3892.65	3892.35	3892.65	3891.95	3891.65	3891.75	3892.15	3891.95	3892.15	3891.95
17	3890.91	3890.71	3891.51	3891.61	3890.91	3891.11	3889.61	3890.41	3890.61	3890.51	3890.61	3890.31
16	3883.23	3882.43	3882.13	3882.63	3881.83	3881.93	3882.03	3882.33	3882.83	3882.83	3882.93	3882.93
[illegible]	3880.99	3880.19	3879.99	3879.99	3879.59	3879.99	3876.89	3879.09	3880.69	3880.49	3880.59	3882.49
[illegible]	3874.39	3874.09	3876.09	3875.59	3875.69	3875.69	3875.49	3875.59	3876.39	3876.09	3875.19	3875.69
[illegible]	3849.26	3849.86	3848.36	3847.76	3846.96	3845.46	3846.06	3846.96	3847.96	3847.26	3847.06	3847.26
[illegible]	3849.80	3846.00	3847.80	3846.90	3846.30	3845.80	3845.80	3846.20	3846.60	3846.10	3846.00	3845.80
10	3839.45	3839.35	3839.15	3839.65	3839.75	3838.95	3839.05	3839.25	3839.35	3839.35	3838.35	3839.15
9	3835.58	3834.78	3835.88	3835.58	3835.68	3836.38	3835.28	3836.78	3836.98	3836.38	3836.08	3835.58
8	3839.00	3838.30	3836.50	3837.40	3837.30	3838.30	3838.30	3838.30	3838.60	3837.50	3837.10	3837.40
25	3824.54	3824.34	3825.14	3825.14	3825.24	3824.34	3826.04	3826.84	3828.34	3828.14	3826.74	3824.14
7	3831.67	3832.07	3832.37	3832.77	3832.87	3833.07	3833.27	3832.97	3833.37	3832.87	3832.17	3831.97
6	3817.75	3817.35	3817.15	3817.05	3816.75	3817.05	3816.85	3819.45	3818.85	3818.55	3818.15	3817.95
5	3809.58	3809.38	3809.58	3809.68	3809.48	3808.98	3808.78	3809.08	3809.28	3809.58	3808.88	3808.88
24	3810.41	3810.21	3810.11	3811.81	3811.41	3811.91	3811.81	3811.71	3812.41	3810.91	3810.61	3810.31
4	3805.36	3804.86	3804.86	3805.16	3805.06	3804.96	3804.96	3804.54	3805.06	3804.76	3804.86	3804.76
27	3803.96	3803.86	3804.96	3808.46	3806.56	3806.86	3807.66	3807.86	3807.86	3804.88	3804.36	3804.16
21	3801.08	3801.08	3801.68	3801.68	3801.28	3801.08	3801.08	3801.48	3801.88	3801.28	3801.18	3801.08
22	3800.10	3799.70	3799.50	3799.90	3799.80	3799.50	3799.30	3799.20	3799.70	3799.20	3799.40	3799.40
23	3792.08	3792.38	3791.78	3792.88	3791.98	3791.98	3791.38	3792.68	3791.88	3791.98	3792.48	3792.28
[illegible]	3802.61	3803.21	3803.41	3803.11	3802.51	3802.81	3803.31	3803.21	3803.51	3802.71	3802.51	3802.41
[illegible]	3797.45	3797.45	3797.05	3798.05	3797.95	3797.65	3798.55	3798.35	3798.45	3797.55	3797.35	3798.25
[illegible]	3788.68	3788.58	3789.08	3789.58	3788.28	3788.78	3789.38	3789.38	3789.58	3788.88	3788.68	3788.38
[illegible]	3784.95	3784.75	3785.75	3786.25	3785.75	3784.95	3785.85	3786.15	3786.05	3785.15	3783.85	3784.75
[illegible]	3788.06	3787.76	3788.56	3789.16	3788.46	3788.16	3788.76	3789.06	3788.36	3788.28	3787.56	3787.66
[illegible]	3780.93	3780.53	3781.63	3781.03	3780.83	3781.03	3781.13	3780.23	3780.63	3780.13	3780.23	3780.13
[illegible]	3779.94	3779.74	3779.84	3780.44	3780.24	3779.84	3779.94	3779.14	3780.04	3779.64	3779.44	3779.34
[illegible]	3770.94	3770.14	3771.64	3771.34	3770.94	3770.74	3770.84	3771.84	3771.84	3770.34	3770.34	3770.04
[illegible]	3760.40	3760.00	3760.10	3760.10	3760.00	3759.20	3759.10	3759.40	3759.60	3759.30	3759.40	3759.40
[illegible]	3761.18	3760.38	3761.58	3761.48	3760.68	3757.98	3759.68	3759.08	3757.68	3759.68	3759.88	3760.08
[illegible]	3747.62	3747.57	3748.22	3748.02	3747.42	3747.62	3747.02	3748.42	3747.72	3747.22	3747.32	3747.12
[illegible]	3746.75	3746.65	3747.55	3747.35	3747.85	3746.95	3747.85	3747.85	3747.45	3746.75	3746.65	3746.15
[illegible]	3736.97	3736.97	3738.07	3737.57	3736.97	3736.87	3737.37	3737.57	3737.47	3737.17	3736.67	3736.67
[illegible]	3738.49	3739.69	3739.29	3738.99	3738.39	3738.99	3739.29	3739.19	3738.79	3738.29	3738.29	3738.29
34	3727.97	3727.57	3730.87	3728.57	3728.17	3728.27	3728.57	3728.87	3728.37	3728.17	3727.27	3727.87
VALLEY MEAN...	3824.44	3824.11	3824.53	3824.45	3824.13	3823.99	3823.89	3824.27	3824.62	3824.18	3823.96	3823.86
MODE 1 MEAN...	3882.93	3882.49	3882.66	3882.45	3882.09	3881.88	3881.30	3881.78	3882.45	3882.22	3882.10	3882.16
MODE 2 MEAN...	3788.78	3788.51	3789.08	3789.08	3788.78	3788.69	3788.89	3789.21	3789.36	3788.78	3788.50	3788.31

(Continued)

TABLE A6. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1968, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3915.82	3915.72	3915.62	3915.52	3915.12	3915.42	3915.32	3916.12	3916.82	3916.92	3916.92	3916.92
30	3918.19	3918.29	3917.39	3917.59	3917.39	3917.46	3917.49	3918.59	3919.49	3919.79	3919.49	3919.19
[illegible]	3911.84	3911.54	3913.94	3911.84	3911.84	3912.94	3912.84	3913.24	3914.04	3913.54	3913.44	3913.14
[illegible]	3896.41	3897.91	3896.01	3896.31	3896.21	3896.51	3897.11	3896.31	3897.31	3896.91	3896.81	3896.81
[illegible]	3891.85	3891.65	3891.75	3892.05	3891.85	3891.65	3891.65	3893.54	3893.85	3893.15	3893.25	3893.15
[illegible]	3890.21	3890.31	3890.61	3890.71	3890.51	3889.11	3889.11	3890.11	3891.41	3891.41	3891.31	3891.21
[illegible]	3883.03	3883.03	3882.03	3882.03	3881.33	3881.73	3882.43	3883.33	3883.63	3883.43	3883.43	3883.33
[illegible]	3883.69	3884.49	3885.69	3884.69	3883.69	3882.89	3882.59	3883.39	3885.69	3881.19	3881.29	3881.09
[illegible]	3875.79	3874.79	3875.59	3875.49	3874.79	3875.29	3875.39	3875.69	3875.59	3874.69	3874.79	3873.49
[illegible]	3847.06	3846.86	3847.26	3847.56	3845.76	3845.66	3846.76	3847.56	3848.06	3847.66	3847.66	3847.76
[illegible]	3845.70	3845.50	3846.90	3845.90	3845.40	3845.10	3845.30	3845.70	3846.10	3846.10	3846.10	3846.10
[illegible]	3838.95	3838.75	3838.55	3838.65	3838.55	3838.55	3838.95	3839.25	3839.55	3839.75	3839.65	3839.35
[illegible]	3835.28	3834.08	3834.28	3834.68	3833.98	3834.68	3835.28	3836.28	3836.78	3835.58	3835.58	3835.68
[illegible]	3837.30	3837.30	3839.30	3838.10	3838.50	3837.90	3838.60	3839.30	3838.90	3837.70	3838.10	3838.10
[illegible]	3824.14	3824.04	3828.37	3825.24	3825.14	3826.14	3826.14	3828.54	3828.64	3825.54	3825.54	3824.94
[illegible]	3831.77	3831.97	3832.07	3832.47	3832.67	3832.67	3832.67	3833.27	3833.27	3832.67	3832.87	3832.07
[illegible]	3817.78	3817.63	3817.45	3817.25	3817.25	3817.25	3820.45	3821.05	3820.85	3818.35	3817.95	3816.75
[illegible]	3808.88	3808.38	3808.98	3808.98	3808.98	3809.28	3809.88	3809.98	3810.58	3809.98	3809.88	3809.58
[illegible]	3810.21	3810.41	3810.91	3811.61	3811.41	3812.51	3812.91	3812.51	3812.21	3810.91	3810.91	3810.51
[illegible]	3804.76	3804.76	3805.06	3805.16	3804.96	3805.16	3805.66	3806.16	3806.46	3805.76	3805.66	3804.66
[illegible]	3803.86	3803.86	3806.96	3806.86	3806.86	3807.46	3807.66	3808.76	3807.46	3805.06	3804.56	3805.16
[illegible]	3800.98	3800.98	3801.68	3801.78	3801.48	3801.88	3801.68	3801.88	3801.98	3801.58	3801.38	3801.28
[illegible]	3798.20	3799.10	3799.60	3799.60	3799.90	3799.30	3799.60	3800.30	3800.50	3800.00	3800.10	3799.90
[illegible]	3792.30	3792.18	3792.28	3792.58	3793.28	3793.28	3793.38	3794.28	3794.38	3793.48	3793.08	3792.78
[illegible]	3802.41	3804.15	3803.11	3803.71	3802.61	3803.21	3804.31	3803.91	3803.91	3803.21	3802.91	3802.71
[illegible]	3797.25	3797.25	3797.45	3798.05	3798.25	3797.85	3798.65	3798.65	3798.35	3797.85	3797.55	3797.35
[illegible]	3788.35	3788.18	3788.38	3789.38	3788.98	3789.38	3789.68	3789.88	3789.48	3788.98	3788.88	3788.68
[illegible]	3784.45	3784.35	3785.15	3785.65	3785.65	3785.75	3786.75	3787.35	3787.25	3785.65	3785.05	3784.65
[illegible]	3787.56	3787.26	3787.86	3788.76	3788.76	3788.66	3789.86	3789.86	3788.86	3788.46	3787.96	3787.76
[illegible]	3780.23	3779.83	3780.43	3780.33	3780.93	3781.13	3781.63	3781.93	3780.73	3780.03	3779.93	3779.73
[illegible]	3779.34	3779.34	3779.24	3780.24	3779.84	3780.14	3780.24	3780.74	3780.54	3780.14	3780.14	3780.24
[illegible]	3770.14	3769.84	3770.44	3769.14	3770.74	3771.34	3771.34	3772.14	3771.74	3770.64	3770.74	3770.24
[illegible]	3759.30	3759.10	3759.20	3759.60	3759.70	3759.80	3759.70	3760.50	3761.40	3760.50	3760.60	3760.40
[illegible]	3760.58	3760.78	3759.98	3760.38	3759.88	3759.68	3759.58	3761.68	3761.48	3761.38	3761.38	3761.48
[illegible]	3746.72	3746.52	3747.42	3746.92	3746.92	3747.02	3747.42	3747.52	3747.52	3747.12	3747.12	3746.82
[illegible]	3746.25	3746.25	3746.75	3747.55	3747.85	3747.85	3748.95	3748.95	3748.85	3747.45	3747.45	3746.95
[illegible]	3736.47	3736.67	3737.37	3737.37	3737.27	3737.47	3737.77	3737.67	3737.47	3736.97	3736.97	3736.97
[illegible]	3738.19	3737.89	3738.59	3738.79	3739.29	3739.29	3739.39	3739.39	3736.99	3738.49	3738.49	3738.59
[illegible]	3728.07	3728.17	3728.87	3728.87	3728.57	3728.67	3728.97	3728.77	3728.67	3728.17	3728.17	3728.27
VALLEY MEAN...	3823.88	3823.57	3824.27	3824.15	3823.95	3824.03	3824.52	3825.08	3825.30	3824.50	3824.45	3824.21
NODE 1 MEAN...	3882.31	3881.74	3882.31	3882.26	3881.60	3881.46	3881.79	3882.60	3883.28	3882.83	3882.80	3882.69
NODE 2 MEAN...	3788.24	3788.09	3788.87	3788.71	3788.79	3789.01	3789.58	3790.00	3789.94	3788.92	3788.87	3788.54

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1969, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3916.72	3916.32	3916.12	3916.72	3916.42	3917.12	3917.82	3919.42	3919.22	3918.92	3918.62	3918.32
20	3919.39	3918.89	3919.09	3920.19	3919.89	3919.29	3920.49	3921.09	3921.39	3920.49	3919.89	3919.29
19	3911.84	3912.14	3912.24	3912.94	3912.74	3913.84	3914.74	3915.84	3915.24	3914.54	3913.74	3913.04
15	3896.31	3896.21	3896.51	3897.01	3896.81	3896.31	3896.91	3897.41	3897.11	3896.81	3896.41	3896.41
18	3892.55	3892.05	3892.45	3893.25	3893.05	3893.75	3895.05	3895.85	3896.65	3896.05	3895.65	3895.05
17	3890.91	3890.61	3891.41	3892.31	3891.81	3891.41	3893.01	3894.21	3894.41	3894.51	3894.11	3893.81
16	3883.41	3883.03	3882.03	3882.63	3882.93	3881.93	3883.93	3884.53	3884.33	3884.33	3884.03	3883.93
12	3881.09	3880.99	3880.79	3880.69	3881.19	3881.09	3881.89	3883.89	3883.09	3882.49	3881.99	3881.69
11	3874.59	3874.29	3876.49	3875.39	3875.19	3875.89	3876.19	3876.49	3876.29	3875.29	3874.69	3874.69
13	3847.66	3847.46	3847.66	3848.66	3849.16	3849.36	3850.26	3850.96	3851.36	3851.06	3851.06	3850.76
14	3845.90	3845.70	3845.90	3846.00	3846.20	3846.60	3846.90	3849.10	3849.70	3850.10	3849.60	3849.20
10	3839.15	3839.05	3839.65	3839.35	3839.45	3839.45	3840.15	3840.75	3840.95	3841.85	3840.85	3840.65
9	3835.48	3835.18	3835.78	3836.16	3836.38	3836.58	3837.18	3837.88	3837.88	3837.58	3837.28	3836.98
8	3837.70	3837.70	3837.50	3838.70	3838.40	3838.50	3839.40	3839.80	3839.20	3837.90	3837.90	3838.10
25	3823.64	3824.14	3825.34	3826.04	3826.74	3827.54	3828.94	3829.94	3829.54	3826.94	3825.94	3825.34
7	3832.07	3831.87	3832.37	3832.77	3833.17	3833.47	3834.27	3834.77	3834.57	3833.87	3833.27	3833.47
6	3816.55	3816.15	3817.25	3817.55	3817.85	3817.45	3819.55	3820.35	3820.75	3818.55	3817.95	3818.05
5	3809.48	3809.08	3809.18	3809.28	3809.68	3809.68	3812.38	3812.38	3813.38	3810.78	3810.28	3810.48
24	3810.41	3810.21	3810.71	3811.81	3812.01	3812.21	3812.61	3812.71	3812.11	3811.21	3810.81	3810.51
4	3805.06	3804.66	3804.66	3804.96	3805.16	3804.36	3806.16	3805.66	3805.36	3805.86	3805.36	3805.46
27	3803.96	3803.86	3805.56	3806.76	3807.06	3807.16	3809.46	3809.66	3808.06	3805.36	3804.76	3804.86
21	3801.18	3801.08	3801.58	3801.38	3801.58	3801.88	3802.98	3803.18	3802.78	3801.98	3801.58	3801.48
23	3798.80	3798.80	3798.90	3799.00	3798.80	3798.90	3799.80	3800.30	3800.00	3799.50	3799.30	3799.30
22	3792.68	3792.08	3791.88	3793.58	3792.78	3794.48	3794.88	3794.58	3794.38	3793.48	3793.08	3793.18
3	3802.51	3802.41	3802.91	3803.51	3802.61	3803.81	3804.51	3804.61	3804.11	3803.51	3803.21	3803.01
28	3797.35	3797.25	3797.65	3798.15	3797.85	3798.25	3799.15	3799.35	3798.95	3799.25	3797.75	3797.65
32	3788.58	3788.38	3789.18	3789.38	3789.18	3789.58	3790.38	3790.68	3790.68	3789.58	3789.08	3788.88
31	3784.55	3784.45	3784.85	3786.05	3786.15	3785.55	3786.55	3786.95	3786.75	3786.95	3787.15	3787.25
30	3787.66	3787.96	3787.46	3788.66	3789.06	3789.36	3790.36	3789.96	3789.76	3788.66	3788.06	3788.16
39	3779.73	3778.33	3778.93	3779.63	3780.33	3779.83	3780.63	3781.43	3780.83	3779.53	3779.13	3779.23
29	3780.14	3779.94	3779.84	3780.74	3780.44	3780.74	3782.34	3781.54	3781.34	3780.64	3778.84	3778.94
38	3770.24	3768.94	3771.04	3771.34	3770.94	3772.04	3773.24	3773.74	3773.44	3771.64	3771.94	3771.94
1	3760.20	3759.90	3760.20	3760.50	3760.50	3761.10	3761.60	3762.10	3761.70	3760.90	3761.10	3761.10
2	3761.78	3760.88	3761.18	3761.58	3761.08	3761.38	3762.18	3763.88	3763.48	3763.08	3762.78	3762.88
37	3746.92	3746.82	3747.52	3747.32	3747.72	3747.62	3748.12	3748.62	3748.52	3747.72	3747.52	3747.52
36	3746.75	3747.65	3747.05	3748.05	3748.75	3748.35	3748.35	3749.85	3750.35	3748.65	3746.05	3748.15
35	3736.97	3736.87	3739.37	3737.67	3737.67	3737.77	3738.37	3738.37	3737.87	3737.37	3737.57	3737.17
33	3738.59	3738.39	3739.39	3739.39	3739.09	3739.39	3740.19	3740.19	3739.59	3739.09	3739.29	3739.39
34	3728.17	3727.97	3728.77	3728.17	3728.57	3728.57	3729.37	3729.47	3729.17	3728.57	3728.77	3728.77
VALLEY MEAN...	3824.01	3823.73	3824.25	3824.75	3824.83	3825.01	3826.01	3826.63	3826.56	3825.74	3825.38	3825.24
NODE 1 MEAN...	3882.46	3882.23	3882.57	3883.20	3883.20	3883.33	3884.31	3885.20	3885.37	3885.08	3884.73	3884.38
NODE 2 MEAN...	3788.36	3788.05	3788.68	3789.11	3789.23	3789.45	3790.46	3790.91	3790.70	3789.56	3789.19	3789.16

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1970, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.02	3917.52	3917.72	3917.62	3917.32	3918.02	3918.62	3919.22	3920.22	3919.32	3919.42	3919.32
20	3918.89	3918.59	3918.79	3918.99	3919.79	3918.89	3919.39	3920.19	3919.99	3919.59	3919.49	3919.19
19	3912.74	3912.04	3912.74	3913.24	3913.54	3914.14	3914.44	3914.04	3914.44	3912.84	3912.64	3912.44
15	3896.41	3896.31	3896.91	3897.01	3897.11	3897.01	3897.31	3897.61	3897.21	3896.61	3896.61	3896.31
18	3894.45	3894.05	3894.65	3895.15	3894.85	3895.75	3897.05	3897.55	3897.75	3897.45	3897.55	3897.45
17	3893.41	3893.01	3893.91	3893.91	3893.91	3894.51	3894.61	3895.31	3896.01	3895.71	3895.71	3895.51
16	3883.93	3883.73	3883.23	3883.53	3884.33	3884.53	3884.83	3885.03	3885.03	3884.53	3884.43	3884.03
12	3891.59	3881.49	3882.09	3881.79	3882.09	3883.19	3884.19	3884.19	3884.19	3884.09	3883.99	3883.69
11	3874.69	3874.89	3876.59	3875.69	3876.09	3876.49	3877.19	3876.79	3876.19	3874.79	3874.69	3874.29
13	3850.56	3849.16	3851.76	3850.76	3850.76	3850.56	3851.46	3852.16	3852.76	3852.16	3851.96	3851.96
14	3848.90	3848.60	3851.30	3849.40	3849.20	3850.30	3850.60	3852.50	3852.30	3851.80	3851.70	3850.50
10	3840.35	3840.35	3841.15	3840.75	3840.75	3840.95	3841.15	3841.75	3842.05	3841.55	3841.25	3839.95
9	3836.58	3836.18	3839.28	3836.98	3837.08	3837.28	3837.48	3838.18	3836.58	3837.68	3837.38	3837.08
8	3837.90	3838.30	3837.60	3838.10	3839.20	3839.50	3839.00	3839.80	3838.70	3838.40	3838.40	3837.70
25	3824.84	3824.64	3825.44	3825.94	3826.74	3827.94	3828.24	3830.34	3828.54	3826.24	3828.04	3827.74
7	3832.67	3832.47	3833.67	3833.47	3834.17	3834.77	3835.07	3835.07	3834.77	3834.07	3834.07	3833.77
6	3818.65	3818.05	3818.35	3818.65	3818.75	3819.25	3820.65	3820.75	3820.55	3819.65	3819.65	3819.05
5	3809.68	3809.28	3808.58	3809.28	3809.88	3811.68	3812.18	3812.48	3811.48	3810.68	3810.68	3810.48
24	3810.41	3810.21	3810.31	3811.51	3812.21	3812.31	3812.11	3812.61	3812.01	3811.21	3811.01	3810.71
4	3804.76	3804.56	3805.26	3805.46	3805.76	3805.96	3806.56	3806.56	3806.46	3806.56	3806.36	3806.06
27	3804.16	3804.06	3804.46	3804.66	3807.36	3808.16	3804.96	3810.16	3807.66	3805.46	3805.56	3805.26
21	3801.28	3801.08	3801.58	3801.98	3802.08	3802.18	3801.88	3802.38	3801.88	3801.88	3801.68	3801.58
23	3799.30	3799.00	3798.30	3798.20	3799.60	3800.90	3801.10	3801.10	3800.30	3799.90	3799.80	3799.40
22	3792.58	3792.58	3793.78	3794.28	3797.08	3797.58	3797.48	3797.28	3793.88	3793.38	3793.48	3793.10
3	3803.71	3803.61	3804.21	3805.01	3804.81	3805.61	3805.71	3805.41	3805.11	3803.41	3803.31	3803.11
28	3797.35	3797.15	3798.15	3798.45	3798.65	3798.75	3798.65	3799.55	3798.95	3798.15	3797.95	3797.75
32	3788.68	3788.48	3788.98	3789.68	3789.58	3789.68	3790.58	3790.58	3790.28	3789.48	3789.18	3788.88
31	3787.15	3786.95	3787.35	3787.25	3787.05	3787.15	3787.15	3787.25	3786.35	3785.65	3785.45	3784.95
30	3787.86	3787.56	3788.16	3788.96	3789.16	3790.26	3791.36	3789.96	3789.26	3788.76	3788.96	3788.56
39	3779.83	3781.93	3779.63	3780.03	3780.33	3780.63	3782.63	3781.33	3780.93	3779.53	3779.43	3779.13
29	3780.44	3780.24	3781.44	3778.84	3780.84	3780.84	3781.74	3781.74	3781.34	3781.04	3780.94	3780.74
38	3770.44	3770.44	3771.54	3772.34	3772.74	3772.74	3773.44	3774.14	3772.14	3771.24	3771.04	3770.74
1	3760.20	3760.00	3760.70	3760.80	3760.90	3761.00	3761.50	3761.50	3761.30	3760.70	3760.60	3760.50
2	3762.48	3762.28	3762.68	3762.48	3762.28	3762.58	3763.38	3763.58	3763.38	3763.18	3762.98	3762.58
37	3747.12	3747.02	3747.72	3747.92	3748.22	3748.12	3748.62	3749.02	3748.72	3748.22	3748.12	3747.52
36	3747.15	3747.05	3748.15	3748.25	3748.95	3749.15	3750.15	3749.85	3748.65	3748.15	3748.05	3745.85
35	3737.07	3736.77	3737.77	3737.77	3737.97	3737.97	3738.47	3738.57	3738.37	3737.97	3737.87	3737.37
33	3730.79	3738.79	3740.19	3739.99	3740.09	3739.89	3740.59	3740.39	3740.09	3739.79	3739.89	3739.89
34	3728.37	3727.97	3730.07	3729.27	3729.47	3729.37	3729.67	3729.47	3729.37	3729.07	3726.87	3728.77
VALLEY MEAN...	3825.10	3824.73	3825.49	3825.48	3825.80	3826.13	3826.71	3827.04	3826.73	3826.07	3825.97	3825.62
NODE 1 MEAN...	3884.47	3883.52	3884.74	3884.44	3884.53	3884.80	3885.39	3885.89	3886.19	3885.62	3885.53	3885.30
NODE 2 MEAN...	3788.88	3788.87	3789.35	3789.51	3789.99	3790.35	3790.92	3791.15	3790.46	3789.75	3789.64	3789.22

(continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1971. ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: HUDSON(1971)

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.22	3917.82	3917.82	3917.42	3917.32	3917.62	3917.92	3918.62	3917.22	3916.02	3916.72	3916.72
20	3918.69	3918.29	3917.79	3917.79	3919.69	3919.29	3919.49	3917.29	3917.69	3918.19	3918.19	3919.39
19	3912.44	3911.94	3912.64	3912.34	3912.64	3912.84	3912.94	3913.14	3912.94	3911.64	3912.24	3912.54
15	3896.61	3895.81	3895.71	3896.71	3896.61	3896.41	3896.51	3896.31	3896.41	3896.11	3896.01	3896.31
18	3894.75	3894.15	3895.35	3893.95	3894.15	3894.05	3894.35	3894.75	3894.15	3894.45	3893.95	3894.35
17	3895.31	3893.81	3895.11	3893.81	3893.61	3893.21	3894.31	3893.61	3893.61	3893.31	3892.81	3893.01
16	3883.43	3883.33	3883.03	3883.03	3882.13	3881.83	3881.93	3881.53	3882.63	3882.93	3882.93	3883.13
12	3883.69	3884.29	3883.39	3884.19	3884.19	3884.29	3884.39	3884.39	3884.19	3884.19	3882.99	3883.19
11	3874.59	3873.89	3875.79	3874.09	3874.09	3873.89	3873.89	3873.69	3873.89	3873.79	3873.59	3873.79
13	3851.06	3850.56	3850.16	3850.36	3849.76	3849.56	3849.26	3849.06	3850.36	3850.16	3849.36	3849.56
14	3850.00	3849.50	3849.30	3849.70	3849.20	3849.10	3848.70	3848.70	3849.20	3849.00	3848.00	3848.20
10	3840.65	3840.55	3840.05	3839.25	3839.95	3840.25	3840.55	3840.45	3840.15	3839.55	3839.55	3839.95
9	3836.78	3836.18	3834.28	3834.08	3836.38	3836.58	3837.48	3837.38	3836.58	3836.28	3835.88	3836.06
8	3837.30	3834.80	3836.60	3834.80	3834.90	3834.80	3835.20	3835.00	3835.20	3834.60	3838.20	3838.30
25	3824.84	3824.24	3824.54	3824.44	3825.74	3825.54	3825.94	3825.84	3825.44	3825.24	3824.24	3824.34
7	3833.07	3832.77	3833.17	3833.77	3833.77	3833.57	3833.87	3834.57	3834.37	3833.27	3832.67	3832.87
6	3818.35	3818.05	3818.25	3818.25	3818.15	3817.95	3818.05	3817.65	3817.65	3817.05	3817.85	3818.35
5	3809.78	3809.68	3810.28	3810.18	3809.98	3810.08	3810.48	3810.48	3809.58	3809.68	3809.48	3809.96
24	3810.41	3810.31	3809.71	3808.51	3811.81	3811.71	3811.51	3812.31	3811.71	3810.91	3810.51	3810.61
4	3805.76	3804.76	3804.96	3804.96	3804.56	3804.36	3804.56	3804.76	3804.76	3804.56	3804.46	3804.66
27	3804.26	3804.16	3803.16	3803.16	3806.96	3805.76	3805.96	3808.16	3806.46	3805.86	3804.26	3804.46
21	3801.48	3801.38	3800.68	3800.18	3801.68	3801.48	3801.68	3801.78	3802.08	3801.48	3801.38	3801.38
23	3799.40	3799.20	3800.70	3799.70	3799.70	3799.60	3799.90	3749.50	3799.70	3799.50	3799.40	3800.10
22	3795.78	3795.88	3795.48	3795.48	3796.28	3796.38	3794.68	3794.58	3793.98	3793.68	3792.26	3792.48
3	3803.71	3803.21	3803.81	3803.81	3803.71	3804.51	3804.91	3803.61	3803.21	3802.71	3802.41	3803.01
28	3797.55	3797.45	3796.45	3795.35	3798.25	3798.15	3798.35	3798.95	3798.25	3797.65	3797.25	3797.35
32	3788.78	3788.68	3789.58	3789.28	3789.38	3789.18	3788.98	3789.08	3788.38	3787.88	3787.98	3788.48
31	3784.85	3784.55	3784.65	3784.45	3784.55	3784.45	3785.05	3785.15	3785.25	3784.85	3785.15	3785.35
30	3787.86	3787.66	3788.66	3788.46	3788.36	3788.06	3788.26	3787.76	3786.96	3786.36	3787.36	3787.56
39	3778.83	3778.33	3779.13	3779.73	3779.53	3779.33	3779.53	3780.13	3779.83	3778.73	3778.83	3778.93
29	3780.44	3780.34	3779.64	3779.24	3780.54	3780.44	3780.64	3780.44	3779.74	3779.74	3779.54	3779.74
38	3770.54	3770.74	3771.04	3772.34	3771.74	3771.84	3772.14	3770.24	3769.94	3768.94	3770.14	3770.24
1	3760.20	3760.10	3760.50	3760.60	3760.50	3760.30	3760.50	3760.90	3760.50	3760.40	3760.00	3760.20
2	3762.48	3761.98	3763.48	3762.38	3761.88	3761.58	3761.98	3761.28	3761.08	3761.28	3761.28	3761.48
37	3747.42	3747.32	3746.82	3748.02	3747.62	3747.52	3747.92	3747.52	3746.82	3747.32	3747.12	3747.62
36	3746.55	3746.55	3747.05	3746.85	3748.15	3748.05	3748.25	3747.75	3746.85	3746.05	3747.45	3747.45
35	3736.87	3736.87	3737.47	3737.37	3737.47	3737.77	3737.67	3737.77	3736.97	3737.27	3736.87	3736.97
33	3739.79	3739.59	3738.79	3741.09	3741.49	3741.39	3741.69	3741.79	3741.19	3740.89	3739.89	3740.09
34	3728.57	3728.57	3729.27	3729.07	3728.97	3728.77	3729.27	3729.27	3728.57	3728.27	3728.17	3728.37
VALLEY MEAN...	3825.15	3824.73	3824.99	3824.89	3825.12	3825.02	3825.23	3825.04	3824.88	3824.52	3824.45	3824.68
NODE 1 MEAN...	3884.65	3884.07	3884.28	3883.91	3883.95	3883.81	3884.00	3883.73	3883.98	3883.78	3883.40	3883.63
NODE 2 MEAN...	3788.86	3788.55	3788.83	3788.89	3789.24	3789.17	3789.39	3789.24	3788.84	3788.38	3788.50	3788.73

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1972, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: USBR; EL PASO, TEXAS

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3916.92	3916.72	3916.62	3916.52	3916.82	3916.02	3915.72	3916.42	3915.62	3916.22	3916.12	3916.32
20	3916.59	3916.39	3915.89	3915.59	3915.29	3914.79	3914.39	3914.19	3915.89	3916.69	3916.59	3916.79
19	3910.74	3910.54	3910.24	3910.04	3909.74	3908.34	3908.04	3907.84	3907.74	3907.94	3908.44	3908.84
15	3895.51	3895.21	3895.11	3895.01	3895.01	3904.41	0.00	3894.81	3894.71	3894.81	3894.61	3894.71
18	3892.45	3892.05	3892.15	3892.15	3891.55	3890.65	3891.15	3890.95	3890.35	3891.95	3891.65	3891.85
17	3891.31	3892.11	3892.01	3891.81	3892.21	3891.01	3890.81	3889.71	3889.91	3895.41	3895.31	3895.81
16	3883.03	3882.23	3882.13	3881.83	3885.13	3887.93	3888.53	3890.93	3887.13	3886.83	3886.73	3886.83
12	3881.39	3883.39	3883.19	3882.89	3882.39	3882.39	3882.29	3882.59	3877.89	3878.09	3877.89	3878.09
11	3872.69	3872.19	3871.89	3871.69	3872.99	3872.79	3873.29	3873.29	3872.89	3872.69	3872.59	3872.79
13	3847.46	3847.26	3846.96	3846.76	3846.76	3846.36	3845.36	3844.46	3847.76	3847.96	3847.86	3848.16
14	3846.20	3845.90	3846.40	3846.20	3845.40	3845.20	3844.30	3843.80	3843.50	3845.20	3845.00	3845.30
10	3838.75	3838.45	3838.05	3837.95	3837.85	3837.55	3837.75	3837.45	3837.65	3837.45	3837.75	3838.05
9	3833.68	3833.20	3833.08	3832.78	3832.08	3832.58	3832.08	3832.18	3832.48	3832.28	3834.88	3835.08
8	3836.60	3836.70	3836.50	3836.40	3836.60	3836.20	3836.40	3836.20	3836.80	3836.40	3836.10	3836.60
25	3821.34	3820.94	3820.74	3820.54	3820.74	3820.54	3820.44	3820.14	3820.54	3821.64	3821.44	3821.74
7	3831.37	3831.07	3830.87	3830.97	3831.87	3831.07	3832.57	3831.97	3831.67	3832.17	3831.97	3832.17
6	3816.85	3815.75	3812.35	3812.25	3815.95	3814.65	3814.45	3814.45	3814.95	3814.65	3814.45	3814.45
5	3808.60	3808.28	3808.48	3808.08	3808.28	3807.98	3807.78	3807.58	3807.88	3808.08	3807.68	3808.38
24	3809.01	3808.91	3808.71	3808.51	3809.91	3809.31	3810.21	3810.21	3809.61	3809.41	3809.21	3809.41
4	3803.46	3803.26	3803.56	3803.46	3803.36	3803.16	3803.06	3803.16	3803.16	3801.96	3801.86	3802.26
27	3801.16	3801.06	3801.06	3800.86	3802.76	3801.66	3803.46	3804.06	3802.36	3803.76	3803.56	3803.86
21	3799.58	3799.48	3798.98	3798.68	3798.48	3798.28	3798.78	3798.18	3798.58	3799.58	3799.48	3799.58
23	3795.50	3795.30	3795.00	3794.80	3794.90	3794.70	3793.70	3793.60	3794.70	3795.80	3795.60	3795.30
22	3795.38	3794.28	3793.18	3792.78	3794.18	3794.38	3794.08	3795.08	3794.88	3795.28	3795.18	3795.38
3	3802.51	3802.51	3802.91	3802.41	3802.21	3802.11	3802.01	3801.91	3801.61	3801.41	3801.21	3801.41
28	3795.45	3795.45	3795.75	3795.55	3795.95	3795.55	3796.05	3797.35	3796.15	3796.75	3796.55	3796.75
32	3784.88	3784.98	3784.78	3784.48	3784.28	3784.18	3783.08	3782.98	3782.78	3783.38	3783.28	3783.48
31	3783.85	3784.25	3784.35	3783.95	3783.95	3783.45	3783.45	3783.35	3783.55	3784.05	3783.95	3783.95
30	3786.46	3786.36	3786.16	3785.96	3784.76	3784.76	3784.46	3784.76	3784.96	3785.16	3784.96	3783.96
39	3776.93	3776.43	3776.73	3776.53	3776.43	3777.13	3776.93	3776.33	3777.03	3777.73	3777.53	3777.73
29	3778.54	3778.44	3778.14	3777.94	3778.34	3778.04	3778.44	3778.34	3778.44	3778.84	3778.64	3778.84
38	3768.04	3767.04	3766.94	3766.74	3765.54	3765.34	3771.04	3772.34	3772.54	3772.84	3772.74	3772.84
1	3767.10	3767.00	3767.30	3767.00	3767.10	3766.90	3767.10	3767.60	3767.10	3766.90	3767.30	3767.40
2	3759.38	3758.68	3758.48	3758.28	3757.78	3757.68	3757.18	3756.88	3757.38	3756.98	3757.58	3757.88
37	3745.92	3745.72	3745.92	3745.72	3744.72	3744.72	3743.22	3743.62	3744.62	3745.02	3744.82	3744.92
36	3744.55	3744.35	3744.75	3744.45	3743.75	3743.15	3743.65	3743.15	3743.05	3743.75	3743.75	3743.95
35	3738.57	3738.67	3739.17	3738.87	3738.67	3738.57	3738.37	3738.17	3738.47	3738.47	3738.37	3738.47
33	3736.29	3736.29	3736.09	3735.79	3736.49	3736.39	3736.59	3736.79	3736.79	3737.19	3737.09	3737.59
34	3728.07	3727.87	3728.17	3727.97	3727.77	3727.57	3727.17	3727.17	3729.17	3729.17	3728.87	3728.97
VALLEY MEAN...	3823.32	3823.11	3822.93	3822.73	3822.86	3822.65	3767.32	3822.54	3822.92	3823.54	3823.49	3823.71
NODE 1 MEAN...	3882.03	3882.00	3881.84	3881.67	3881.70	3881.56	3734.74	3880.54	3881.11	3882.34	3882.34	3882.61
NODE 2 MEAN...	3787.51	3787.19	3787.01	3786.78	3786.98	3786.72	3787.14	3787.17	3787.43	3787.68	3787.60	3787.79

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1973, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: USBR; EL PASO, TEXAS

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3916.72	3917.32	3917.52	3915.22	3915.72	3915.52	3914.92	3916.12	3916.62	3916.92	3917.52	3917.32
20	3916.99	3917.39	3917.59	3917.19	3917.39	3917.19	3918.19	3918.59	3919.29	3918.69	3918.59	3918.19
19	3909.04	3910.24	3910.34	3909.34	3909.84	3908.84	3909.84	3910.04	3910.84	3910.64	3910.74	3910.44
15	3895.41	3895.91	3896.31	3895.81	3895.91	3894.61	3895.01	3895.31	3894.61	3896.21	3896.01	3895.91
18	3892.55	3893.15	3893.55	3892.95	3893.75	3890.25	3891.15	3892.25	3892.05	3892.35	3892.15	3891.85
17	3896.01	3896.41	3896.81	3895.71	3896.01	3890.31	3890.71	3891.41	3891.21	3891.71	3891.61	3891.41
16	3887.03	3886.93	3887.13	3882.93	3883.33	3883.23	3883.63	3884.13	3883.33	3883.43	3883.13	3882.63
12	3877.89	3878.49	3879.39	3879.39	3880.29	3880.19	3879.79	3880.29	3880.19	3879.49	3879.99	3879.89
11	3872.59	3872.79	3872.59	3871.89	3872.19	3871.99	3872.39	3872.99	3872.59	3872.19	3871.99	3872.09
13	3848.46	3848.66	3848.66	3847.56	3848.16	3847.56	3847.76	3848.46	3847.56	3848.06	3847.86	3847.56
14	3845.60	3846.50	3846.60	3845.60	3846.10	3845.80	3846.20	3846.70	3846.10	3846.30	3846.10	3845.80
10	3838.45	3838.95	3839.15	3838.65	3839.05	3838.75	3839.05	3840.15	3842.55	3842.05	3841.45	3841.25
9	3835.28	3836.28	3836.78	3835.18	3835.68	3835.28	3835.68	3836.28	3835.48	3834.68	3834.48	3834.18
8	3837.00	3837.20	3837.50	3836.30	3836.80	3836.40	3833.80	3834.40	3835.80	3836.70	3836.40	3836.20
25	3821.64	3821.74	3821.84	3821.94	3823.04	3822.54	3823.74	3824.04	3823.84	3824.14	3824.34	3823.94
7	3832.87	3833.17	3833.47	3832.37	3832.67	3832.47	3833.47	3833.77	3834.27	3833.67	3833.27	3833.27
6	3815.25	3815.85	3816.25	3815.55	3815.65	3815.35	3817.25	3817.15	3818.05	3817.55	3817.25	3817.25
5	3808.78	3808.88	3809.38	3808.78	3809.38	3808.78	3810.58	3810.18	3811.46	3810.38	3810.08	3809.68
24	3809.21	3809.31	3809.41	3810.41	3810.61	3810.41	3810.61	3811.01	3811.01	3811.01	3809.71	3810.41
4	3802.56	3802.96	3803.56	3803.16	3803.56	3802.96	3803.76	3803.96	3804.16	3803.96	3803.56	3803.76
27	3804.46	3804.86	3804.66	3804.36	3804.86	3804.46	3806.06	3806.26	3805.86	3805.66	3805.26	3804.96
21	3799.78	3800.18	3800.48	3800.28	3800.58	3800.18	3801.18	3801.38	3800.98	3800.78	3800.38	3800.18
23	3796.40	3796.70	3796.30	3796.60	3797.50	3797.10	3798.70	3799.30	3798.70	3798.40	3796.90	3797.20
22	3795.18	3794.98	3795.18	3795.58	3795.98	3795.28	3796.38	3796.78	3796.18	3795.58	3795.98	3794.98
3	3801.61	3802.31	3802.61	3802.11	3802.41	3801.81	3802.41	3802.61	3801.71	3801.31	3800.81	3801.01
28	3797.05	3797.95	3797.75	3795.95	3796.25	3796.15	3796.45	3796.65	3796.45	3796.65	3795.45	3795.25
32	3783.68	3784.08	3784.58	3784.18	3784.58	3784.28	3785.28	3785.68	3785.08	3784.78	3784.48	3784.26
31	3783.75	3784.15	3783.85	3783.75	3784.15	3783.75	3784.15	3784.35	3783.95	3783.55	3783.45	3783.35
30	3783.76	3784.06	3783.96	3783.96	3784.46	3784.26	3785.26	3785.56	3785.76	3785.46	3785.16	3785.06
39	3779.13	3779.73	3779.53	3778.13	3778.33	3777.93	3779.73	3780.13	3780.03	3779.63	3779.33	3779.33
29	3778.64	3778.44	3778.64	3779.84	3779.84	3779.44	3780.14	3780.64	3780.54	3780.54	3779.64	3779.44
38	3773.04	3773.34	3772.94	3773.44	3773.74	3773.54	3773.54	3773.74	3773.54	3773.14	3772.74	3772.54
1	3767.40	3767.50	3767.30	3768.00	3767.80	3767.50	3767.80	3768.00	3769.10	3768.90	3768.00	3768.10
2	3758.28	3758.88	3759.18	3758.28	3758.68	3758.08	3759.28	3759.48	3759.98	3759.46	3758.98	3759.68
37	3745.12	3745.92	3745.72	3746.02	3746.42	3746.32	3746.92	3747.17	3747.52	3747.02	3746.92	3746.72
36	3743.75	3743.95	3743.75	3744.95	3745.05	3745.35	3746.95	3747.15	3747.15	3746.55	3745.05	3745.05
35	3738.27	3738.57	3738.57	3738.17	3738.37	3737.97	3738.37	3738.57	3738.17	3737.77	3737.67	3737.57
33	3737.69	3738.19	3737.59	3737.79	3737.79	3737.39	3737.79	3737.99	3738.29	3738.19	3737.09	3736.99
34	3728.77	3729.17	3728.97	3729.27	3729.37	3728.97	3728.47	3728.77	3728.87	3728.17	3725.97	3726.97
VALLEY MEAN...	3824.00	3824.39	3824.49	3824.01	3824.38	3823.56	3824.17	3824.58	3824.60	3824.50	3824.09	3823.98
NODE 1 MEAN...	3882.89	3883.34	3883.55	3882.58	3883.05	3881.42	3881.83	3882.47	3882.28	3882.47	3882.35	3882.11
NODE 2 MEAN...	3788.08	3788.44	3788.47	3788.30	3788.61	3788.28	3789.01	3789.27	3789.42	3789.14	3788.55	3788.53

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1974, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL.
INFORMATION SOURCE: USBR; EL PASO, TEXAS

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3918.12	3917.72	3916.72	3917.52	3917.12	3918.12	3918.12	3918.42	3918.52	3918.12	3917.72	3917.32
20	3917.89	3917.69	3915.59	3917.79	3918.99	3920.49	3919.99	3919.99	3919.49	3919.59	3918.59	3918.69
19	3910.24	3910.24	3910.64	3911.94	3913.14	3913.14	3913.64	3912.74	3913.04	3913.04	3910.44	3912.44
15	3895.81	3895.01	3895.51	3896.21	3896.01	3895.81	3895.21	3895.01	3895.41	3894.81	3896.71	3897.21
18	3891.75	3891.85	3893.45	3893.85	3893.75	3893.85	3893.65	3893.25	3893.85	3893.55	3893.05	3893.15
17	3891.81	3891.61	3892.41	3892.91	3893.31	3891.81	3893.01	3893.41	3894.01	3893.71	3892.41	3893.61
16	3884.03	3883.73	3882.23	3881.73	3881.93	3882.73	3882.33	3882.63	3882.73	3882.41	3883.83	3884.23
12	3881.79	3881.59	3883.29	3881.29	3880.29	3880.99	3880.59	3881.19	3880.79	3880.49	3880.39	3880.39
11	3871.39	3871.09	3872.19	3871.99	3872.69	3872.79	3872.99	3871.19	3870.69	3870.19	3872.59	3872.19
13	3847.36	3847.16	3847.56	3847.86	3848.06	3848.76	3848.55	3849.26	3849.16	3848.86	3848.56	3848.46
14	3845.50	3845.20	3846.20	3846.50	3846.20	3847.40	3848.00	3847.70	3847.80	3847.70	3846.70	3847.30
10	3840.75	3840.45	3837.85	3837.55	3837.45	3838.05	3838.55	3838.25	3837.95	3837.45	3842.45	3842.05
9	3833.98	3833.68	3833.48	3833.88	3834.28	3835.48	3836.18	3836.68	3835.88	3835.68	3835.48	3834.38
8	3836.10	3835.90	3836.20	3837.10	3837.40	3838.30	3838.20	3837.80	3837.50	3838.90	3837.00	3836.50
25	3823.64	3823.34	3820.14	3820.64	3822.34	3822.94	3823.44	3823.64	3823.04	3823.04	3824.54	3823.34
7	3832.97	3832.67	3831.47	3832.77	3833.27	3833.67	3833.87	3834.57	3835.07	3834.67	3834.27	3835.07
6	3817.05	3816.75	3812.85	3815.85	3817.35	3817.35	3818.05	3818.25	3818.45	3818.05	3817.25	3817.55
5	3809.08	3808.78	3808.18	3808.38	3810.78	3811.38	3811.58	3811.68	3811.88	3810.78	3810.58	3810.28
24	3810.01	3809.41	3809.11	3808.91	3810.51	3811.21	3811.11	3811.31	3810.81	3809.91	3810.71	3809.61
4	3803.56	3802.96	3803.46	3803.06	3803.66	3804.16	3804.46	3804.86	3802.96	3802.96	3804.36	3802.26
27	3804.66	3804.46	3800.86	3800.16	3802.16	3803.66	3803.86	3804.36	3804.56	3804.26	3804.86	3804.26
21	3800.08	3800.08	3799.18	3799.28	3799.88	3800.28	3800.68	3801.18	3801.18	3800.78	3801.18	3800.88
23	3796.90	3796.70	3795.40	3796.70	3797.70	3799.10	3798.60	3798.60	3798.30	3797.40	3798.70	3796.90
22	3794.78	3794.38	3792.88	3794.28	3795.48	3795.68	3796.18	3796.88	3797.28	3796.98	3795.98	3795.38
3	3800.61	3800.21	3802.61	3802.81	3803.01	3803.61	3803.81	3804.11	3804.61	3804.31	3801.81	3803.51
28	3795.15	3794.95	3795.95	3796.05	3795.85	3796.25	3796.75	3796.55	3796.65	3795.95	3796.65	3795.65
32	3783.88	3783.68	3784.98	3784.68	3784.68	3784.88	3785.08	3785.18	3784.98	3784.68	3784.98	3783.58
31	3782.95	3782.75	3783.95	3783.45	3783.95	3784.25	3784.35	3784.55	3784.95	3784.55	3783.15	3782.25
30	3784.76	3784.36	3785.96	3785.56	3785.86	3786.16	3786.76	3787.16	3787.46	3786.96	3785.18	3784.76
39	3778.23	3778.03	3776.53	3777.83	3780.33	3780.93	3780.73	3780.63	3781.13	3780.63	3779.53	3779.13
29	3779.24	3779.04	3777.84	3778.64	3779.34	3779.64	3779.64	3779.94	3779.94	3779.66	3780.24	3779.54
38	3771.74	3771.44	3766.64	3767.14	3767.44	3767.74	3768.34	3768.64	3769.14	3768.74	3772.44	3771.54
1	3767.80	3767.70	3767.10	3768.60	3768.50	3768.30	3768.60	3768.70	3768.60	3767.90	3766.00	3768.50
2	3759.28	3759.08	3758.78	3758.88	3759.28	3759.78	3760.28	3760.88	3761.88	3761.38	3759.58	3761.48
37	3746.12	3745.82	3745.72	3746.02	3747.62	3747.92	3748.02	3748.32	3748.62	3747.87	3746.72	3747.52
36	3744.75	3744.45	3744.45	3746.05	3746.85	3748.05	3748.55	3747.35	3747.65	3746.85	3746.75	3745.95
35	3737.97	3737.77	3738.97	3738.77	3739.37	3739.57	3739.57	3739.77	3739.77	3739.37	3737.37	3736.97
33	3736.99	3736.59	3735.99	3737.59	3737.79	3738.19	3738.19	3738.09	3738.49	3737.59	3738.39	3737.39
34	3728.07	3727.97	3727.97	3729.07	3729.07	3729.77	3729.37	3729.57	3730.57	3730.47	3727.97	3728.77
VALLEY MEAN...	3823,78	3823,54	3823,04	3823,70	3824,34	3824,74	3824,92	3825,03	3825,13	3824,79	3824,63	3824,58
NODE 1 MEAN...	3882,14	3881,96	3882,24	3882,67	3882,92	3883,16	3883,29	3883,37	3883,45	3883,20	3882,91	3883,22
NODE 2 MEAN...	3788,19	3787,92	3786,92	3787,73	3788,61	3789,11	3789,33	3789,45	3789,56	3789,16	3789,06	3788,81

(Continued)

TABLE A8. (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1975, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: USBR; EL PASO, TEXAS

USBR WELL NO,	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3917.72	3917.32	3917.82	3918.12	3918.72	3918.52	3918.82	3919.82	3919.92	3918.92	3919.02	3918.52
20	3919.19	3918.19	3918.39	3919.09	3919.39	3918.79	3918.99	3920.69	3920.69	3919.79	3919.19	3919.09
19	3913.04	3912.04	3912.24	3912.14	3912.64	3912.74	3912.84	3913.14	3913.44	3912.14	3912.24	3911.84
15	3897.61	3896.01	3896.41	3896.21	3897.31	3897.61	3897.01	3896.81	3896.31	3896.31	3896.01	3896.41
18	3893.75	3894.35	3894.75	3893.55	3894.45	3895.55	3894.95	3893.55	3894.25	3894.25	3894.35	3894.85
17	3894.01	3894.41	3894.71	3894.71	3895.71	3896.01	3895.61	3896.71	3896.41	3896.71	3895.01	3894.71
16	3884.83	3884.23	3884.53	3883.23	3883.13	3882.63	3882.33	3885.13	3885.23	3883.13	3883.33	3882.63
12	3880.69	3880.79	3881.29	3881.09	3881.39	3881.99	3881.79	3881.99	3881.79	3880.39	3881.19	3880.69
11	3872.59	3872.29	3872.59	3872.79	3872.39	3872.79	3872.59	3871.89	3871.59	3871.29	3872.99	3872.59
13	3849.16	3848.56	3849.16	3848.86	3849.86	3850.76	3850.56	3850.06	3850.26	3850.06	3849.66	3849.36
14	3847.70	3848.20	3848.40	3848.00	3848.50	3850.00	3849.40	3848.20	3848.50	3848.40	3848.20	3848.40
10	3842.45	3842.25	3842.45	3842.65	3842.35	3842.65	3842.65	3842.75	3842.35	3842.35	3842.85	3839.35
9	3835.08	3835.28	3836.08	3835.68	3836.58	3837.68	3837.48	3836.68	3836.08	3835.58	3835.48	3835.58
8	3837.00	3836.60	3837.30	3838.80	3838.80	3839.00	3838.60	3837.00	3838.20	3837.00	3836.50	3836.00
25	3823.54	3823.24	3823.74	3824.24	3824.74	3825.04	3825.44	3825.94	3826.34	3826.24	3824.74	3824.24
7	3835.87	3836.27	3836.47	3835.17	3835.47	3835.67	3835.47	3835.27	3834.77	3834.27	3833.47	3832.97
6	3818.35	3818.25	3818.65	3817.85	3818.05	3818.45	3818.25	3819.15	3819.25	3818.75	3818.25	3817.55
5	3810.98	3810.68	3810.78	3810.58	3810.98	3811.58	3811.18	3812.08	3811.68	3810.98	3810.78	3810.28
24	3810.01	3809.81	3810.21	3810.61	3810.81	3811.31	3811.01	3811.71	3811.21	3810.41	3808.51	3808.41
4	3802.56	3801.96	3802.36	3802.76	3803.16	3803.76	3803.66	3804.16	3803.96	3805.26	3804.56	3803.76
27	3804.86	3804.26	3804.46	3805.16	3805.06	3805.26	3804.86	3804.06	3803.66	3803.56	3802.56	3802.06
21	3801.18	3801.68	3801.98	3801.78	3802.08	3802.58	3802.28	3801.58	3801.18	3801.48	3800.38	3799.98
23	3797.40	3797.10	3797.50	3797.90	3798.70	3798.90	3799.60	3799.50	3799.50	3797.50	3797.00	3796.00
22	3795.68	3795.18	3795.38	3795.78	3795.58	3796.98	3796.78	3797.48	3797.48	3795.68	3795.38	3794.68
3	3804.01	3803.61	3803.81	3802.81	3800.51	3801.21	3800.81	3801.81	3801.41	3802.51	3802.01	3802.51
28	3796.15	3795.75	3795.95	3796.35	3796.75	3796.95	3796.55	3796.85	3796.45	3796.15	3796.35	3796.45
32	3784.58	3784.28	3784.68	3785.28	3785.08	3785.48	3785.08	3784.68	3784.28	3784.58	3785.56	3785.08
31	3782.55	3782.15	3782.35	3782.95	3782.75	3782.95	3782.75	3783.35	3782.85	3782.85	3783.25	3782.85
30	3784.96	3784.56	3784.96	3784.76	3785.56	3785.76	3786.06	3785.76	3785.36	3785.46	3785.46	3784.96
39	3780.03	3779.53	3779.83	3779.63	3779.33	3779.53	3779.63	3780.93	3780.53	3779.43	3778.53	3778.03
29	3779.74	3779.24	3779.34	3779.44	3779.04	3779.44	3779.04	3779.44	3779.64	3779.24	3778.64	3778.34
38	3771.54	3771.14	3771.34	3771.74	3771.54	3771.54	3770.94	3771.34	3770.74	3771.04	3770.74	3770.34
1	3768.70	3768.10	3768.30	3768.40	3768.70	3768.90	3768.90	3768.80	3768.60	3768.00	3766.20	3767.70
2	3762.18	3761.68	3761.88	3760.68	3763.88	3764.28	3763.88	3763.48	3761.98	3761.28	3760.18	3760.88
37	3747.72	3747.12	3747.52	3747.92	3748.12	3748.02	3748.42	3748.22	3748.12	3747.72	3746.92	3745.92
36	3746.35	3745.95	3746.15	3746.35	3745.95	3746.85	3747.45	3747.85	3747.05	3745.45	3746.15	3745.65
35	3738.17	3737.57	3737.87	3738.97	3739.07	3739.37	3738.57	3738.17	3737.77	3738.07	3738.37	3738.07
33	3737.99	3737.79	3737.99	3738.19	3738.39	3738.79	3738.59	3737.69	3737.39	3737.29	3736.79	3736.29
34	3728.97	3728.47	3728.77	3729.47	3730.17	3729.07	3729.47	3730.17	3729.97	3729.17	3728.97	3728.47
VALLEY MEAN...	3825.07	3824.76	3825.09	3825.05	3825.34	3825.72	3825.57	3825.74	3825.62	3825.24	3824.88	3824.48
NODE 1 MEAN...	3883.73	3883.49	3883.87	3883.64	3884.29	3884.78	3884.56	3884.61	3884.67	3884.32	3884.09	3883.78
NODE 2 MEAN...	3789.29	3788.94	3789.25	3789.32	3789.38	3789.70	3789.59	3789.84	3789.61	3789.20	3788.76	3788.32

(Continued)

TABLE A-8 (CONTINUED)

MESILLA VALLEY WATER LEVELS FOR 1976, ALL UNITS ARE IN FEET ABOVE MEAN SEA LEVEL,
INFORMATION SOURCE: USBR; EL PASO, TEXAS

USBR WELL NO.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
26	3920.12	3918.32	3919.02	3918.52	3919.12	3919.02	3920.12	3920.22	3920.12	3919.82	3919.52	3919.12
20	3918.19	3918.39	3917.39	3918.89	3919.19	3918.49	3919.39	3926.09	3920.59	3919.09	3918.59	3918.59
19	3910.94	3910.94	3911.84	3912.24	3913.44	3913.14	3912.64	3912.24	3913.04	3913.04	3912.64	3912.44
15	3896.21	3892.81	3896.81	3896.41	3896.31	3897.81	3896.61	3892.01	3897.01	3896.51	3895.21	3898.81
18	3893.65	3894.35	3893.85	3894.35	3892.55	3896.15	3893.85	3893.65	3894.35	3894.75	3893.75	3893.95
17	3895.41	3896.01	3894.41	3895.71	3896.71	3896.41	3896.41	3893.71	3896.01	3895.71	3891.71	3895.81
16	3882.53	3884.73	3883.13	3883.63	3883.33	3883.63	3882.93	3894.33	3885.13	3885.53	3886.13	3885.13
12	3881.39	3880.89	3881.19	3881.39	3881.59	3882.09	3882.09	3881.99	3882.19	3883.79	3881.89	3881.89
11	3872.29	3870.99	3873.79	3872.79	3871.99	3872.49	3872.99	3872.99	3871.79	3872.29	3872.49	3876.99
13	3848.86	3848.86	3849.36	3849.76	3850.16	3851.16	3851.16	3848.46	3850.56	3849.26	3848.96	3852.46
14	3847.30	3847.50	3848.90	3848.40	3847.70	3850.80	3849.80	3844.90	3848.30	3847.80	3847.50	3847.50
10	3840.35	3841.35	3839.35	3842.85	3841.35	3842.45	3839.85	3837.25	3842.65	3840.65	3839.25	3842.55
9	3836.28	3835.68	3834.28	3836.48	3835.88	3838.28	3837.88	3833.58	3835.68	3835.98	3835.48	3839.08
8	3836.00	3837.20	3834.50	3839.00	3837.00	3839.40	3838.10	3837.00	3838.00	3837.80	3836.50	3836.30
25	3823.74	3825.54	3822.24	3824.74	3824.54	3825.44	3825.74	3821.54	3826.94	3825.24	3824.24	3828.54
7	3832.67	3834.47	3833.97	3835.27	3835.97	3835.47	3835.97	3832.97	3835.07	3834.27	3833.67	3833.27
6	3817.25	3818.05	3819.05	3817.05	3818.95	3818.65	3819.65	3818.45	3819.05	3819.05	3816.65	3818.25
5	3810.38	3810.38	3810.28	3810.68	3811.18	3811.78	3811.98	3811.78	3812.18	3811.39	3811.58	3809.78
24	3809.61	3809.81	3807.61	3810.41	3811.41	3811.01	3811.71	3811.61	3810.71	3810.21	3808.91	3809.51
4	3804.06	3800.86	3804.26	3802.96	3801.66	3804.06	3802.86	3802.86	3803.76	3804.46	3803.46	3807.16
27	3801.56	3802.56	3801.26	3805.66	3804.56	3805.66	3805.06	3804.56	3803.86	3805.06	3801.86	3804.16
21	3800.48	3800.38	3798.98	3801.98	3801.98	3802.28	3802.38	3797.48	3800.88	3801.78	3801.48	3794.88
23	3796.80	3797.10	3799.00	3798.30	3799.20	3799.20	3797.90	3797.90	3799.10	3798.50	3797.00	3796.80
22	3794.98	3795.88	3796.18	3796.38	3796.68	3797.18	3796.58	3797.78	3797.18	3796.78	3796.48	3796.38
3	3802.51	3801.01	3803.01	3803.01	3799.81	3801.41	3799.81	3801.21	3801.41	3801.51	3802.51	3805.11
28	3795.85	3795.55	3793.95	3796.55	3796.75	3797.25	3796.85	3796.65	3796.75	3796.95	3795.75	3795.55
32	3785.08	3783.68	3784.58	3785.48	3784.58	3785.28	3785.28	3782.58	3784.88	3784.58	3784.58	3790.08
31	3783.55	3782.35	3785.85	3783.15	3782.85	3782.75	3783.15	3782.75	3782.75	3783.85	3784.75	3787.35
30	3785.36	3784.96	3787.46	3784.96	3784.96	3785.56	3786.56	3784.16	3785.56	3785.96	3786.06	3787.65
39	3779.83	3778.93	3778.53	3779.73	3780.03	3779.93	3781.03	3778.13	3780.33	3780.23	3778.93	3778.73
29	3779.34	3778.94	3778.64	3779.64	3780.64	3779.84	3779.64	3777.84	3779.04	3779.84	3779.94	3779.64
38	3771.54	3770.34	3771.04	3771.94	3771.34	3771.34	3771.34	3772.04	3770.54	3770.54	3768.04	3773.64
1	3767.70	3767.90	3768.30	3768.50	3768.80	3769.10	3769.20	3768.80	3768.20	3768.20	3767.20	3769.20
2	3760.58	3760.18	3761.18	3760.88	3761.68	3764.58	3763.88	3759.18	3761.68	3751.48	3761.38	3761.18
37	3747.22	3747.42	3747.12	3747.92	3740.32	3747.92	3749.02	3745.42	3747.72	3747.62	3747.52	3747.32
36	3745.45	3745.65	3745.15	3746.15	3740.15	3746.95	3747.95	3747.75	3746.75	3745.45	3746.25	3745.75
35	3738.37	3737.57	3740.57	3739.37	3738.77	3739.57	3738.77	3738.07	3737.47	3738.57	3736.57	3739.67
33	3737.99	3737.19	3737.29	3738.59	3737.49	3738.59	3737.99	3737.89	3736.99	3738.29	3737.29	3737.19
34	3728.97	3728.87	3728.87	3729.57	3730.07	3728.77	3730.37	3730.57	3729.97	3729.37	3728.47	3727.37
VALLEY MEAN...	3824.65	3824.59	3824.63	3825.34	3825.38	3825.92	3825.84	3824.60	3825.57	3825.27	3824.45	3825.90
NODE 1 MEAN...	3883.54	3883.57	3883.70	3884.19	3884.23	3885.11	3884.72	3883.55	3884.70	3884.25	3883.20	3885.17
NODE 2 MEAN...	3788.73	3788.62	3788.61	3789.44	3789.48	3789.82	3789.94	3788.65	3789.51	3789.30	3788.62	3789.76

(Continued)

TABLE A9. SURFACE WATER SAMPLE LOCATIONS TAKEN DURING THIS PROJECT STUDY

Site #	Name and general location	Remarks
1	Rio Grande at Leasburg Dam	
2	Leasburg Canal at Leasburg Dam	water quality assumed equal to Site #1
3	Selden Drain at N.M. State Route 85	
4	Leasburg Drain near N.M. State Route 85	
5	Pacacho Drain below Nusbaum Lateral	
6	Rio Grande at Mesilla Dam	
7	East Side Canal at Mesilla Dam	water quality assumed equal to Site #6
8	West Side Canal at Mesilla Dam	water quality assumed equal to Site #6
9	Del Rio Drain at East Side Canal	
10	Mesilla Drain at East Side Canal	
11	Mesquite Drain near East Side Canal at Bannock Lateral	
12	Del Rio Drain at Vado off N.M. State Route 80-85A	
13	Chamberino Drain off N.M. State Route 266; north of LaMesa Drain and Marquez Lateral	
14	LaMesa Drain at Rio Grande above W.W. 31	
15	Anthony Drain above East Drain and South of Anthony, Texas	
16	East Drain below Anthony Drain Junction	
17	West Drain at Texas State Route 260	
18	Nemexas Drain at Texas State Route 260	
19	Montoya Drain at N.M.-Texas State Line	
20	Rio Grande at El Paso (Crouchane Bridge)	

TABLE A-10.

MONTHLY DRAIN FLOWS IN ACRE-FEET/MONTH.

SITE	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5	1975	215.	194.	295.	298.	246.	268.	307.	307.	446.	523.	226.	277.
5	1976	357.	288.	246.	446.	461.	298.	277.	369.	446.	282.	297.	228.
12	1975	2029.	1586.	2214.	3142.	3720.	3540.	3720.	4027.	3898.	4027.	2987.	2337.
12	1976	2582.	3060.	3720.	3285.	3597.	2291.	3843.	3413.	3421.	3376.	1815.	2017.
14	1975	277.	400.	658.	982.	1136.	1696.	2367.	2798.	3570.	3105.	2249.	1076.
14	1976	1199.	1007.	1138.	1547.	2595.	2707.	2490.	3413.	3005.	1347.	863.	707.
16	1975	584.	355.	381.	583.	676.	833.	1045.	1568.	2410.	2490.	1607.	738.
16	1976	861.	518.	615.	1357.	1599.	2707.	1722.	1691.	1934.	855.	893.	793.
17	1974	603.	255.	584.	1696.	1937.	2005.	2054.	2029.	2558.	2152.	1363.	1906.
17	1975	1722.	1222.	1051.	1380.	1537.	1654.	2214.	1875.	4195.	4027.	2856.	1107.
17	1976	1261.	1311.	1599.	1993.	3167.	3600.	1875.	3794.	3671.	1882.	1220.	922.
18	1974	449.	250.	430.	768.	781.	1125.	1599.	1722.	1952.	1783.	655.	769.
18	1975	707.	483.	535.	863.	1014.	1190.	1660.	1537.	1666.	1875.	1202.	646.
18	1976	646.	863.	1076.	1619.	1064.	1220.	1537.	1476.	1428.	1334.	595.	461.
19	1975	2675.	1899.	2718.	3154.	2798.	3005.	3658.	3720.	5224.	5257.	4034.	2423.
19	1976	2705.	3077.	2798.	3046.	4323.	4493.	3720.	3400.	3291.	3074.	2975.	2472.

TABLE A-11. SURFACE FLOW AND WATER QUALITY DATA, MESILLA VALLEY

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
1	19/ 9/75	0.00	173.0	10.6	135.0	24.2	260.0	0.0	133.0	390.0	0.0	0.00	1125.8	0.0
1	20/11/75	0.00	152.0	12.9	143.0	28.6	248.0	0.0	158.0	346.0	1.7	8.09	1090.2	1460.0
1	14/ 1/76	0.00	91.0	9.4	187.0	35.8	265.0	0.0	161.0	389.0	3.5	7.88	1141.7	1780.0
1	26/ 2/76	0.00	87.0	7.0	78.0	13.4	204.0	0.0	96.0	126.0	2.0	8.02	613.4	840.0
1	2/ 4/76	0.00	73.0	5.5	63.0	11.4	168.0	12.6	45.0	138.0	0.1	8.09	516.6	640.0
1	30/ 4/76	0.00	62.0	5.9	62.0	11.7	170.0	0.0	40.0	130.0	0.4	8.21	482.0	640.0
1	17/ 5/76	0.00	71.0	2.0	61.0	11.2	157.0	12.6	46.0	145.0	0.1	8.35	505.9	630.0
1	24/ 6/76	0.00	70.0	5.5	62.0	12.2	200.0	0.0	42.0	138.0	0.5	8.31	530.2	620.0
1	29/ 7/76	0.00	72.0	5.5	64.0	10.9	204.0	0.0	43.0	127.0	2.3	8.23	528.7	680.0
1	26/ 8/76	0.00	75.0	6.6	60.0	11.5	167.0	8.4	47.0	148.0	2.0	8.54	525.5	620.0
1	4/10/76	0.00	148.0	8.6	130.0	25.0	218.0	0.0	125.0	359.0	1.0	8.14	1014.6	1310.0
1	2/11/76	0.00	303.0	41.1	110.0	17.5	238.0	24.0	386.0	255.0	0.0	8.26	1374.7	1960.0
1	7/12/76	0.00	240.0	23.5	135.0	24.1	387.0	0.0	252.0	308.0	0.0	7.66	1369.6	1710.0
1	10/ 1/77	0.00	296.2	38.7	121.2	19.3	278.2	0.0	370.6	299.2	0.0	7.40	1423.6	1920.0
1	3/ 2/77	0.00	186.8	8.6	129.9	27.6	200.1	9.6	162.1	396.7	0.3	8.15	1123.7	1620.0
1	3/ 3/77	0.00	217.6	10.9	134.9	30.9	207.4	0.0	196.4	484.1	0.2	8.29	1282.5	1800.0
1	14/ 4/77	0.00	102.6	7.4	67.1	13.5	197.7	0.0	80.8	163.8	0.2	8.09	633.1	880.0
1	9/ 5/77	0.00	107.9	8.2	74.7	15.0	179.4	16.8	90.4	183.5	0.1	8.35	676.0	950.0
1	7/ 6/77	0.00	90.8	9.2	71.3	14.7	206.2	3.6	74.1	160.4	0.3	8.32	629.7	900.0
1	11/ 7/77	0.00	91.8	7.8	54.5	11.7	195.2	8.4	58.9	172.9	0.6	8.17	611.8	810.0
1	9/ 8/77	0.00	97.8	7.6	59.3	13.0	185.5	0.0	71.6	182.5	0.1	8.41	617.6	860.0
1	8/ 9/77	0.00	98.9	7.0	64.5	14.3	162.3	10.8	81.2	167.1	0.2	8.37	606.4	890.0
1	9/10/77	0.00	181.7	12.1	119.0	26.3	209.9	0.0	142.9	432.3	0.2	8.07	1124.3	0.0
1	6/11/77	0.00	197.3	10.2	135.5	30.3	227.0	0.0	161.0	453.4	0.2	8.09	1214.8	1620.0

SEE PRECEDING TABLES FOR FLOW RECORDS. IF NOT LISTED THERE, THEN THEY ARE CURRENTLY UNAVAILABLE, OR WERE NOT RECORDED.

ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
3	19/ 9/75	0.00	190.0	12.9	130.0	26.9	198.0	0.0	160.0	400.0	0.0	0.00	1117.8	0.0
3	20/11/75	0.00	161.0	13.3	157.0	28.6	327.0	0.0	168.0	350.0	2.5	7.98	1207.4	1580.0
3	14/ 1/76	0.00	220.0	10.6	161.0	29.3	412.0	0.0	169.0	394.0	5.3	7.72	1401.2	1840.0
3	26/ 2/76	0.00	134.0	11.0	77.0	25.7	145.0	0.0	143.0	299.0	0.3	7.89	835.0	1360.0
3	2/ 4/76	0.00	196.0	10.2	69.0	25.2	251.0	0.0	149.0	295.0	0.0	7.92	995.4	1410.0
3	30/ 4/76	0.00	190.0	10.2	70.0	23.0	312.0	0.0	136.0	272.0	0.2	7.84	1013.4	1400.0
3	17/ 5/76	0.00	164.0	10.6	66.0	21.9	181.0	0.0	146.0	284.0	0.3	7.98	873.8	1350.0
3	24/ 6/76	0.00	166.0	9.4	121.0	23.1	333.0	0.0	150.0	294.0	2.7	8.07	1099.2	1250.0
3	29/ 7/76	0.00	182.0	8.6	129.0	23.7	328.0	0.0	154.0	292.0	3.4	8.01	1120.7	1420.0
3	26/ 8/76	0.00	191.0	10.6	59.0	22.2	154.0	0.0	162.0	290.0	3.1	8.23	891.9	1280.0
3	4/10/76	0.00	176.0	9.4	79.0	23.0	211.0	0.0	137.0	305.0	2.9	8.18	943.3	1290.0
3	2/11/76	0.00	205.0	9.8	126.0	26.7	265.0	15.6	171.0	361.0	2.8	8.24	1182.9	1590.0
3	7/12/76	0.00	201.0	9.4	171.0	28.7	319.0	0.0	160.0	455.0	5.4	7.74	1349.5	1650.0
3	10/ 1/77	0.00	196.2	11.3	163.7	27.7	300.2	0.0	159.6	460.1	3.6	7.69	1322.4	1600.0
3	3/ 2/77	0.00	166.8	10.2	121.6	25.8	175.7	0.0	149.6	415.9	0.5	8.07	1066.1	1540.0
3	8/ 9/77	0.00	162.4	10.6	96.2	20.6	268.4	16.8	133.7	274.7	0.9	8.36	984.2	1370.0
3	9/10/77	0.00	165.1	9.0	93.8	22.3	137.3	0.0	132.6	384.2	0.0	7.73	944.4	0.0

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ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE.

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

(CONTINUED)

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
5	19/ 9/75	0.00	221.0	9.4	143.0	25.0	309.0	0.0	175.0	418.0	1.6	8.02	1302.0	1600.0
5	20/11/75	0.00	157.0	10.6	152.0	26.5	266.0	0.0	162.0	350.0	0.7	8.12	1124.8	1490.0
5	15/ 1/76	0.00	207.0	7.8	155.0	25.9	364.0	0.0	163.0	366.0	0.3	7.74	1289.0	1770.0
5	26/ 2/76	0.00	415.0	8.2	99.0	26.0	276.0	0.0	169.0	337.0	1.1	8.13	1331.3	1570.0
5	2/ 4/76	0.00	199.0	8.2	95.0	25.5	248.0	0.0	162.0	334.0	0.3	8.34	1072.0	1490.0
5	30/ 4/76	0.00	212.0	9.4	98.0	27.4	293.0	0.0	163.0	352.0	1.2	7.75	1156.0	1600.0
5	17/ 5/76	0.00	175.0	9.0	95.0	24.4	157.0	0.0	162.0	374.0	2.1	8.14	998.5	1540.0
5	24/ 6/76	0.00	154.0	8.2	147.0	25.5	337.0	0.0	162.0	354.0	1.9	8.18	1189.6	1380.0
5	29/ 7/76	0.00	183.0	8.2	120.0	25.5	306.0	0.0	151.0	321.0	7.0	8.08	1121.7	1510.0
5	26/ 8/76	0.00	179.0	8.2	82.0	24.4	178.0	0.0	155.0	323.0	3.3	8.22	952.9	1340.0
5	4/10/76	0.00	201.0	8.2	95.0	27.7	201.0	0.0	164.0	416.0	0.8	8.12	1113.7	1520.0
5	3/11/76	0.00	208.0	7.8	156.0	27.6	259.0	15.6	173.0	421.0	0.7	8.12	1268.7	1620.0
5	7/12/76	0.00	208.0	7.0	154.0	27.4	306.0	0.0	169.0	425.0	0.8	8.13	1297.2	1620.0
5	10/ 1/77	0.00	172.7	7.8	136.3	23.6	279.4	0.0	155.3	388.6	0.6	8.06	1164.4	1430.0
5	3/ 2/77	0.00	177.6	7.4	101.4	21.3	196.5	0.0	157.4	339.6	0.3	8.42	1001.4	1490.0
5	3/ 3/77	0.00	185.6	9.8	128.5	24.3	218.4	15.6	164.9	403.0	0.4	8.59	1150.4	1600.0
5	14/ 4/77	0.00	198.5	8.6	142.3	26.4	272.1	0.0	169.5	397.2	0.5	7.98	1215.1	1710.0
5	9/ 5/77	0.00	181.9	9.0	133.9	24.3	253.8	18.0	158.2	390.0	0.4	8.44	1189.4	1640.0
5	7/ 6/77	0.00	161.2	9.0	117.6	21.8	273.3	0.0	133.7	315.1	0.2	8.17	1031.9	1400.0
5	11/ 7/77	0.00	178.0	9.4	107.0	23.1	216.0	12.0	134.4	363.1	0.1	8.21	1043.1	1460.0
5	9/ 8/77	0.00	203.8	10.2	111.2	24.9	218.4	13.2	168.8	405.4	0.1	8.56	1156.0	1600.0
5	8/ 9/77	0.00	196.9	8.6	142.5	28.1	256.2	24.0	174.5	422.7	0.0	8.33	1253.5	1730.0
5	9/10/77	0.00	214.6	7.8	116.8	25.2	245.5	0.0	167.7	438.0	0.4	7.94	1217.0	0.0
5	6/11/77	0.00	193.9	7.8	144.3	27.0	300.2	0.0	167.4	397.7	0.8	8.02	1239.0	1670.0

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ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
6	19/ 9/75	0.00	183.0	12.9	123.0	24.3	198.0	0.0	143.0	375.0	0.0	0.00	1059.2	0.0
6	20/11/75	0.00	163.0	14.9	141.0	27.3	251.0	0.0	184.0	358.0	3.4	8.14	1142.6	1540.0
6	14/ 1/76	0.00	234.0	12.9	137.0	27.7	339.0	0.0	204.0	364.0	8.5	7.72	1327.2	1850.0
6	26/ 2/76	0.00	92.0	7.8	89.0	14.8	215.0	0.0	105.0	145.0	3.4	8.11	672.0	940.0
6	31/ 3/76	0.00	72.0	5.5	65.0	11.6	173.0	0.0	48.0	131.0	0.1	8.28	506.2	650.0
6	29/ 4/76	0.00	72.0	5.9	54.0	12.3	178.0	0.0	42.0	134.0	0.4	7.89	498.6	660.0
6	17/ 5/76	0.00	62.0	6.3	61.0	11.4	165.0	0.0	43.0	132.0	0.5	8.49	491.7	640.0
6	24/ 6/76	0.00	70.0	5.9	62.0	11.8	184.0	10.5	43.0	160.0	1.6	8.51	525.5	630.0
6	29/ 7/76	0.00	78.0	5.9	70.0	11.7	205.0	7.2	48.0	129.0	3.5	8.35	551.1	740.0
6	26/ 8/76	0.00	75.0	6.3	62.0	11.7	168.0	0.0	47.0	142.0	1.9	8.54	525.9	640.0
6	4/10/76	0.00	164.0	10.2	115.0	23.6	221.0	12.0	139.0	313.0	1.8	8.50	1005.6	1280.0
6	2/11/76	0.00	202.0	13.3	125.0	26.1	209.0	18.0	185.0	370.0	8.9	8.50	1162.1	1530.0
6	7/12/76	0.00	207.0	14.9	138.0	27.1	288.0	22.8	190.0	367.0	1.3	7.95	1233.4	1640.0
6	10/ 1/77	0.00	203.8	13.3	120.4	23.1	269.7	0.0	177.7	364.1	15.0	8.04	1187.0	1470.0
6	3/ 2/77	0.00	166.3	12.5	112.2	24.3	222.1	0.0	190.1	317.5	3.9	8.44	1083.3	1620.0
6	3/ 3/77	0.00	204.0	16.8	105.8	22.6	197.7	14.4	190.1	339.1	1.8	8.69	1103.1	1580.0
6	14/ 4/77	0.00	97.3	7.4	68.5	13.9	152.5	25.2	83.0	164.7	0.3	8.34	605.6	870.0
6	9/ 5/77	0.00	103.5	9.4	74.7	15.2	186.7	18.0	95.0	189.2	0.7	8.47	686.5	970.0
6	7/ 6/77	0.00	95.2	7.8	70.7	14.6	181.8	12.0	75.5	173.9	0.3	8.38	633.0	890.0
6	11/ 7/77	0.00	87.2	7.8	67.3	12.4	185.5	13.2	63.5	167.1	1.6	8.24	600.8	860.0
6	9/ 8/77	0.00	91.5	7.4	60.1	13.3	181.8	8.4	62.8	165.2	0.2	8.60	591.9	830.0
6	8/ 9/77	0.00	101.7	7.0	68.7	16.8	172.0	9.6	81.6	158.5	0.8	8.36	605.1	890.0
6	9/10/77	0.00	182.4	14.9	95.8	20.6	257.5	0.0	182.3	293.9	2.8	8.00	1050.0	0.0

SEE PRECEDING TABLES FOR FLOW RECORDS. IF NOT LISTED THERE, THEN THEY ARE CURRENTLY UNAVAILABLE, OR WERE NOT RECORDED.

ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
9	20/11/75	0.00	131.0	10.2	119.0	23.0	270.0	0.0	117.0	259.0	3.6	7.98	932.8	1170.0
9	14/ 1/76	0.00	146.0	7.8	133.0	21.9	334.0	0.0	126.0	279.0	1.4	7.74	1049.1	1450.0
9	26/ 2/76	0.00	140.0	7.8	97.0	20.6	253.0	0.0	124.0	248.0	2.5	8.08	892.9	1220.0
9	31/ 3/76	0.00	144.0	7.8	75.0	19.9	215.0	14.7	122.0	240.0	1.4	8.18	839.8	1160.0
9	29/ 4/76	0.00	128.0	7.8	99.0	19.6	246.0	0.0	109.0	228.0	1.3	7.84	838.7	1140.0
9	17/ 5/76	0.00	122.0	7.4	98.0	17.6	203.0	16.2	111.0	248.0	0.5	8.55	823.7	1110.0
9	24/ 6/76	0.00	121.0	7.4	102.0	18.0	267.0	0.0	107.0	236.0	1.5	8.42	859.9	1050.0
9	29/ 7/76	0.00	141.0	7.4	119.0	20.4	284.0	0.0	113.0	261.0	2.0	8.40	947.8	1230.0
9	26/ 8/76	0.00	134.0	8.2	79.0	19.1	197.0	16.8	107.0	242.0	6.6	8.36	809.7	1080.0
9	4/10/76	0.00	138.0	7.8	107.0	19.0	232.0	19.2	104.0	280.0	2.6	8.59	909.6	1090.0
9	2/11/76	0.00	146.0	7.4	116.0	20.4	229.0	21.6	116.0	313.0	1.6	8.47	971.0	1220.0
9	7/12/76	0.00	157.0	7.0	134.0	22.9	284.0	0.0	123.0	319.0	0.8	8.10	1047.7	1300.0
9	10/ 1/77	0.00	151.1	7.8	121.2	22.0	279.4	0.0	125.9	335.7	0.9	8.05	1044.1	1240.0
9	3/ 2/77	0.00	147.2	7.4	107.6	19.2	213.5	13.2	126.2	290.1	1.3	8.44	925.8	1380.0
9	3/ 3/77	0.00	142.6	7.0	115.6	20.4	208.7	16.8	126.6	309.3	0.5	8.70	947.6	1310.0
9	14/ 4/77	0.00	129.0	7.8	108.4	19.5	173.3	34.8	117.7	275.2	0.4	8.24	866.1	1250.0
9	9/ 5/77	0.00	135.9	8.2	111.2	19.8	206.2	22.8	119.9	284.3	0.4	8.55	908.7	1250.0
9	7/ 6/77	0.00	153.4	8.6	108.2	19.6	253.8	0.0	116.0	315.1	0.5	8.20	975.1	1250.0
9	11/ 7/77	0.00	129.3	8.2	99.8	18.7	227.0	8.4	109.2	263.2	0.4	8.10	864.1	1210.0
9	9/ 8/77	0.00	126.5	8.6	89.0	15.3	61.0	30.0	100.4	240.2	0.3	8.58	671.2	1120.0
9	8/ 9/77	0.00	123.7	7.8	101.8	18.7	218.4	10.8	107.8	171.9	2.7	8.32	763.8	1180.0
9	9/10/77	0.00	125.3	7.4	110.4	19.2	246.5	0.0	108.9	292.0	0.5	7.96	910.3	0.0
9	6/11/77	0.00	144.4	7.8	104.6	19.7	264.8	0.0	118.4	282.4	0.8	8.05	943.0	1250.0

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ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/1	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
11	20/11/75	0.00	396.0	23.9	170.0	55.5	314.0	0.0	299.0	793.0	5.1	8.15	2056.5	2660.0
11	14/ 1/76	0.00	419.0	16.0	168.0	51.4	499.0	0.0	282.0	697.0	0.0	7.74	2132.4	2840.0
11	26/ 2/76	0.00	263.0	14.5	92.0	36.8	243.0	0.0	207.0	498.0	2.9	8.01	1357.2	1960.0
11	31/ 3/76	0.00	159.0	9.4	93.0	21.3	200.0	0.0	112.0	267.0	2.9	8.24	864.6	1140.0
11	29/ 4/76	0.00	203.0	11.0	71.0	24.7	260.0	0.0	121.0	323.0	4.1	7.62	1017.8	1410.0
11	17/ 5/76	0.00	211.0	12.9	93.0	24.3	175.0	6.0	146.0	450.0	8.3	8.43	1126.5	1610.0
11	24/ 6/76	0.00	285.0	13.3	116.0	32.6	277.0	10.8	168.0	515.0	5.7	8.72	1423.4	1790.0
11	29/ 7/76	0.00	129.0	8.6	70.0	16.7	233.0	0.0	74.0	215.0	3.5	8.37	749.8	1000.0
11	26/ 8/76	0.00	211.0	14.1	59.0	23.1	181.0	0.0	138.0	363.0	2.5	8.30	991.7	1390.0
11	4/10/76	0.00	337.0	18.4	132.0	38.7	277.0	0.0	213.0	654.0	6.3	8.20	1676.4	2120.0
11	2/11/76	0.00	497.0	19.6	173.0	57.1	294.0	16.8	314.0	968.0	6.9	8.23	2346.4	2990.0
11	7/12/76	0.00	467.0	19.6	164.0	56.9	323.0	0.0	297.0	913.0	2.4	8.23	2243.0	2820.0
11	10/ 1/77	0.00	413.3	18.8	130.7	50.6	212.3	10.8	274.5	834.3	0.0	8.39	1945.2	2450.0
11	3/ 2/77	0.00	496.1	18.0	116.2	50.3	256.2	0.0	329.8	908.7	0.0	8.41	2175.5	3220.0
11	3/ 3/77	0.00	708.4	25.8	109.8	62.5	146.4	8.4	446.4	1219.5	0.2	8.48	2727.5	3850.0
11	14/ 4/77	0.00	101.7	8.2	70.7	14.6	159.8	18.0	83.0	193.1	0.3	8.31	649.4	930.0
11	9/ 5/77	0.00	93.2	7.8	66.7	12.9	176.9	10.8	79.4	172.9	0.0	8.41	620.7	880.0
11	7/ 6/77	0.00	99.4	8.6	74.3	14.1	207.4	0.0	81.6	174.8	0.1	8.12	660.3	900.0
11	11/ 7/77	0.00	90.6	9.8	64.5	12.5	184.3	14.4	63.1	159.5	0.0	8.10	598.7	830.0
11	9/ 8/77	0.00	88.6	8.6	63.1	11.7	196.5	8.4	62.8	158.5	0.0	8.07	598.1	820.0
11	8/ 9/77	0.00	100.7	8.6	66.1	14.0	201.3	0.0	73.8	159.5	0.0	8.22	624.1	880.0

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ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SURFACE FLOW AND WATER QUALITY DATA, MESILLA VALLEY

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
12	19/ 9/75	0.00	183.0	11.3	109.0	20.3	245.0	0.0	147.0	327.0	2.4	8.05	1045.0	1460.0
12	20/11/75	0.00	159.0	12.5	134.0	23.9	295.0	0.0	149.0	325.0	3.6	8.06	1102.0	1460.0
12	14/ 1/76	0.00	208.0	9.4	147.0	24.6	376.0	0.0	150.0	342.0	2.6	7.85	1259.6	1730.0
12	26/ 2/76	0.00	158.0	10.6	126.0	23.1	287.0	0.0	150.0	304.0	2.5	8.10	1061.2	1460.0
12	31/ 3/76	0.00	192.0	9.8	71.0	23.0	195.0	14.7	146.0	293.0	3.2	8.18	947.7	1340.0
12	29/ 4/76	0.00	190.0	10.6	83.0	23.1	284.0	0.0	139.0	292.0	2.4	7.87	1024.1	1440.0
12	17/ 5/76	0.00	175.0	11.3	78.0	21.8	171.0	6.9	144.0	345.0	2.7	8.58	955.7	1400.0
12	24/ 6/76	0.00	158.0	9.0	101.0	19.5	282.0	6.0	126.0	290.0	2.9	8.46	994.4	1210.0
12	29/ 7/76	0.00	193.0	9.8	122.0	23.0	308.0	0.0	139.0	319.0	1.8	8.19	1115.6	1450.0
12	26/ 8/76	0.00	177.0	12.5	67.0	21.0	193.0	0.0	135.0	311.0	1.5	8.31	918.0	1240.0
12	4/10/76	0.00	196.0	10.6	103.0	23.5	220.0	0.0	139.0	370.0	3.2	8.25	1065.3	1420.0
12	2/11/76	0.00	205.0	10.2	130.0	24.7	251.0	20.4	154.0	405.0	2.6	8.21	1202.9	1530.0
12	7/12/76	0.00	210.0	9.4	136.0	24.9	298.0	6.0	153.0	392.0	2.7	8.08	1231.9	1540.0
12	10/ 1/77	0.00	194.4	10.6	130.7	25.7	302.6	0.0	150.7	417.9	2.4	8.03	1234.8	1450.0
12	3/ 2/77	0.00	187.0	9.8	123.2	28.5	230.6	0.0	153.9	401.5	2.2	8.31	1136.7	1590.0
12	3/ 3/77	0.00	185.6	10.2	116.2	23.0	219.6	15.6	150.7	384.2	1.7	8.52	1106.9	1530.0
12	14/ 4/77	0.00	165.6	11.7	107.6	21.0	208.7	32.4	140.8	331.4	0.8	8.57	1020.0	1450.0
12	9/ 5/77	0.00	184.2	11.7	111.2	21.6	235.5	20.4	139.4	343.9	0.4	8.56	1068.4	1460.0
12	7/ 6/77	0.00	172.5	11.3	113.8	22.1	245.3	16.8	139.0	336.2	1.7	8.31	1058.7	1460.0
12	11/ 7/77	0.00	183.8	10.9	108.2	21.4	250.1	16.8	138.6	343.9	2.0	8.23	1075.8	1490.0
12	9/ 8/77	0.00	163.5	10.9	101.2	20.2	175.7	18.0	122.3	326.6	2.1	8.67	940.6	1420.0
12	80/97/71	0.00	166.5	9.8	110.6	22.5	256.2	13.2	130.5	322.8	0.2	8.36	1032.3	1410.0
12	9/10/77	0.00	196.4	9.8	99.4	23.6	284.3	0.0	140.4	361.2	2.1	7.99	1117.2	0.0
12	6/11/77	0.00	200.1	10.9	117.6	26.0	305.1	0.0	155.3	388.1	2.3	7.87	1205.6	1610.0

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ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
14	19/ 9/75	0.00	238.0	11.3	159.0	29.8	323.0	0.0	189.0	448.0	2.4	8.04	1400.5	1800.0
14	20/11/75	0.00	163.0	10.2	160.0	31.4	301.0	0.0	203.0	357.0	3.4	7.89	1229.4	1610.0
14	14/ 1/76	0.00	254.0	10.2	218.0	36.4	445.0	0.0	223.0	515.0	1.1	7.89	1702.7	2370.0
14	26/ 2/76	0.00	205.0	10.2	118.0	31.3	299.0	0.0	187.0	405.0	2.0	8.08	1257.5	1740.0
14	31/ 3/76	0.00	188.0	9.4	112.0	30.2	212.0	0.0	179.0	366.0	2.2	8.14	1098.8	1600.0
14	29/ 4/76	0.00	217.0	9.8	103.0	30.0	310.0	0.0	165.0	383.0	3.0	7.82	1220.8	1680.0
14	17/ 5/76	0.00	182.0	9.8	103.0	27.7	162.0	0.0	158.0	391.0	3.5	8.36	1037.0	1570.0
14	24/ 6/76	0.00	175.0	9.4	145.0	26.5	308.0	6.0	153.0	361.0	2.5	8.45	1186.4	1500.0
14	29/ 7/76	0.00	203.0	9.0	123.0	28.9	319.0	0.0	159.0	388.0	5.3	8.10	1235.2	1620.0
14	26/ 8/76	0.00	191.0	9.6	96.0	27.7	170.0	0.0	160.0	427.0	4.9	8.20	1086.4	1450.0
14	4/10/76	0.00	215.0	9.8	125.0	32.6	261.0	0.0	175.0	472.0	4.3	8.13	1294.7	1720.0
14	2/11/76	0.00	252.0	13.7	211.0	36.2	279.0	44.4	219.0	599.0	3.2	8.30	1657.5	2030.0
14	7/12/76	0.00	252.0	9.0	213.0	30.7	333.0	10.8	213.0	567.0	2.0	8.11	1636.5	2040.0
14	10/ 1/77	0.00	237.8	10.9	200.4	35.4	342.9	0.0	208.5	618.6	2.0	8.18	1656.5	1930.0
14	3/ 2/77	0.00	213.9	10.2	147.9	32.2	203.6	0.0	215.2	518.2	1.5	8.22	1342.9	2070.0
14	3/ 3/77	0.00	241.0	12.1	169.1	35.9	270.9	0.0	235.1	588.4	1.3	8.23	1553.9	2150.0
14	15/ 4/77	0.00	187.9	10.9	134.5	28.0	253.8	10.8	169.9	403.0	0.9	8.31	1199.6	1720.0
14	19/ 5/77	0.00	184.2	10.2	134.7	25.8	244.0	21.6	157.1	397.7	0.2	8.49	1175.5	1630.0
14	7/ 6/77	0.00	190.9	11.3	146.7	27.5	316.0	0.0	171.3	424.6	1.0	8.23	1289.4	1770.0
14	11/ 7/77	0.00	182.2	10.2	125.9	26.5	248.9	18.0	151.4	420.7	1.3	8.26	1185.1	1650.0
14	9/ 8/77	0.00	181.9	10.9	129.1	25.3	256.2	16.8	148.6	409.2	1.3	8.69	1179.4	1630.0
14	6/ 9/77	0.00	177.6	9.4	135.1	25.8	257.5	18.0	148.9	380.4	0.4	8.46	1153.0	1630.0
14	9/10/77	0.00	234.6	21.1	163.7	36.0	285.5	0.0	236.5	542.7	2.4	8.24	1522.6	0.0
14	6/11/77	0.00	304.8	16.8	167.3	35.6	363.6	0.0	262.0	586.0	2.0	7.89	1738.1	2400.0

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ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
16	19/ 9/75	0.00	462.0	24.3	134.0	35.1	438.0	0.0	414.0	570.0	5.6	8.19	2083.1	2750.0
16	20/11/75	0.00	383.0	42.6	138.0	43.3	409.0	0.0	292.0	593.0	1.3	7.91	1902.2	2920.0
16	14/ 1/76	0.00	704.0	48.5	119.0	36.3	600.0	0.0	589.0	653.0	0.2	7.79	2750.0	3870.0
16	26/ 2/76	0.00	96.0	9.8	83.0	15.5	210.0	0.0	111.0	152.0	3.3	7.90	680.6	940.0
16	31/ 3/76	0.00	320.0	21.9	77.0	29.7	231.0	0.0	297.0	381.0	1.5	8.23	1359.1	1940.0
16	29/ 4/76	0.00	444.0	27.0	61.0	15.9	355.0	0.0	322.0	408.0	3.1	7.84	1636.0	2290.0
16	17/ 5/76	0.00	247.0	22.3	60.0	21.0	198.0	11.4	204.0	357.0	1.9	8.80	1122.6	1610.0
16	24/ 6/76	0.00	390.0	29.7	101.0	27.8	376.0	0.0	330.0	457.0	2.1	8.27	1713.6	2140.0
16	29/ 7/76	0.00	367.0	27.0	69.0	28.4	367.0	0.0	286.0	398.0	5.1	8.21	1547.5	2160.0
16	26/ 8/76	0.00	221.0	21.9	58.0	20.2	225.0	20.4	191.0	238.0	4.4	8.58	999.9	1410.0
16	5/10/76	0.00	530.0	39.5	117.0	40.1	271.0	18.0	481.0	654.0	3.3	8.34	2153.9	2960.0
16	2/11/76	0.00	611.0	41.5	116.0	40.5	354.0	13.2	548.0	788.0	1.6	8.47	2513.8	3390.0
16	7/12/76	0.00	678.0	46.1	102.0	40.4	416.0	6.0	572.0	732.0	0.5	8.19	2593.0	3460.0
16	10/ 1/77	0.00	659.2	49.7	107.2	39.0	436.8	9.6	575.5	711.8	0.5	8.06	2589.4	3330.0
16	3/ 2/77	0.00	685.9	45.7	76.8	37.8	346.5	7.2	590.1	711.8	0.4	8.49	2502.2	3660.0
16	3/ 3/77	0.00	677.6	49.7	86.6	38.4	396.6	9.6	594.3	734.4	1.0	8.42	2588.0	3720.0
16	14/ 4/77	0.00	296.9	22.7	86.4	24.7	222.1	43.2	274.1	385.7	0.9	8.71	1356.6	2020.0
16	9/ 5/77	0.00	488.5	43.0	105.6	35.5	338.0	28.8	422.3	597.5	0.4	8.54	2059.7	2940.0
16	7/ 6/77	0.00	444.8	37.5	99.2	31.3	372.2	14.4	390.1	545.6	0.2	8.34	1935.2	2790.0
16	11/ 7/77	0.00	500.0	36.0	95.4	32.3	362.4	120.0	407.8	562.9	0.8	8.32	2117.6	2790.0
16	9/ 8/77	0.00	318.8	28.9	88.2	25.3	291.6	37.2	283.0	382.3	0.6	8.76	1455.9	2160.0
16	8/ 9/77	0.00	183.5	34.8	94.2	28.1	340.4	26.4	373.7	528.3	0.2	8.47	1609.7	2660.0
16	9/10/77	0.00	601.2	47.7	127.9	33.6	377.0	0.0	542.5	706.0	2.1	8.03	2438.0	0.0
16	6/11/77	0.00	603.1	43.8	97.2	37.1	364.8	0.0	525.2	693.6	1.7	7.99	2366.3	3470.0

SEE PRECEDING TABLES FOR FLOW RECORDS. IF NOT LISTED THERE, THEN THEY ARE CURRENTLY UNAVAILABLE, OR WERE NOT RECORDED.

ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
19	19/ 9/75	0.00	329.0	10.2	121.0	28.2	364.0	0.0	256.0	498.0	2.7	8.15	1609.1	2120.0
19	20/11/75	0.00	326.0	11.7	141.0	41.4	356.0	20.4	295.0	531.0	2.8	8.10	1725.3	2310.0
19	14/ 1/76	0.00	440.0	8.6	145.0	33.3	495.0	0.0	314.0	556.0	1.1	7.99	1993.0	2760.0
19	26/ 2/76	0.00	270.0	8.6	77.0	26.0	298.0	0.0	226.0	370.0	3.1	8.09	1278.7	1800.0
19	31/ 3/76	0.00	287.0	8.2	55.0	27.5	201.0	0.0	204.0	387.0	1.8	8.24	1171.5	1730.0
19	29/ 4/76	0.00	310.0	9.0	64.0	28.8	312.0	0.0	219.0	408.0	1.8	7.89	1352.6	1970.0
19	17/ 5/76	0.00	267.0	9.0	62.0	24.1	191.0	0.0	200.0	427.0	3.1	8.35	1183.2	1760.0
19	24/ 6/76	0.00	263.0	8.2	119.0	27.0	359.0	0.0	208.0	417.0	3.8	8.28	1405.1	1680.0
19	29/ 7/76	0.00	284.0	7.4	90.0	28.4	344.0	0.0	196.0	405.0	7.4	8.17	1362.2	1850.0
19	26/ 8/76	0.00	290.0	8.6	59.0	28.0	182.0	0.0	219.0	427.0	3.8	8.37	1217.4	1680.0
19	5/10/76	0.00	317.0	8.2	83.0	32.7	238.0	0.0	255.0	520.0	2.7	8.25	1456.6	2080.0
19	2/11/76	0.00	381.0	8.6	142.0	36.5	298.0	10.8	291.0	622.0	1.9	8.31	1791.8	2380.0
19	7/12/76	0.00	442.0	7.8	142.0	35.5	383.0	3.6	308.0	636.0	1.2	8.25	1959.1	2480.0
19	10/ 1/77	0.00	417.2	3.1	128.3	33.4	345.3	16.8	331.2	615.3	1.5	8.12	1892.1	2460.0
19	3/ 2/77	0.00	519.8	9.0	92.8	31.5	291.6	0.0	395.7	629.7	1.7	8.38	1971.8	2880.0
19	4/ 3/77	0.00	552.9	10.6	112.6	35.6	370.9	6.0	418.8	736.3	1.3	8.40	2245.1	3170.0
19	14/ 4/77	0.00	392.1	10.2	100.8	27.8	253.8	27.6	312.8	500.0	1.2	8.68	1626.1	2370.0
19	9/ 5/77	0.00	383.4	10.2	117.2	29.7	306.3	25.2	300.7	570.6	0.6	8.56	1743.8	2480.0
19	7/ 6/77	0.00	312.8	11.3	105.8	26.5	341.7	0.0	226.6	453.4	0.5	8.21	1478.7	2000.0
19	11/ 7/77	0.00	328.0	9.8	101.2	27.5	308.7	21.6	220.6	482.2	1.0	8.34	1500.6	2080.0
19	9/ 8/77	0.00	333.0	10.2	93.6	25.5	309.9	9.6	220.6	463.0	1.2	8.74	1466.6	2040.0
19	8/ 9/77	0.00	291.2	7.8	99.2	25.7	285.5	24.0	208.2	451.5	3.3	8.52	1396.3	1940.0
19	9/10/77	0.00	380.4	8.2	137.5	31.4	317.3	0.0	289.7	595.6	1.5	8.09	1761.5	0.0
19	6/11/77	0.00	450.3	11.3	112.6	33.1	430.7	0.0	299.6	635.9	2.1	8.14	1975.8	2590.0

SEE PRECEDING TABLES FOR FLOW RECORDS. IF NOT LISTED THERE, THEN THEY ARE CURRENTLY UNAVAILABLE, OR WERE NOT RECORDED.

ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE. (CONTINUED)

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-11 (CONTINUED)

SITE	DATE	FLOW AC-FT	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
20	20/11/75	0.00	266.0	14.5	141.0	29.2	304.0	0.0	264.0	494.0	2.2	8.23	1514.9	2090.0
20	14/ 1/76	0.00	361.0	11.7	149.0	30.4	439.0	0.0	263.0	488.0	1.4	8.15	1743.5	2400.0
20	26/ 2/76	0.00	190.0	10.2	106.0	21.7	264.0	0.0	179.0	293.0	4.6	8.00	1068.5	1510.0
20	31/ 3/76	0.00	132.0	6.7	51.0	15.7	205.0	0.0	89.0	196.0	0.9	8.52	696.3	940.0
20	29/ 4/76	0.00	120.0	7.4	58.0	16.4	213.0	0.0	91.0	219.0	0.9	8.11	733.7	1030.0
20	17/ 5/76	0.00	118.0	7.4	73.0	14.8	196.0	15.0	85.0	227.0	1.2	8.67	737.4	940.0
20	24/ 6/76	0.00	112.0	7.8	77.0	15.6	221.0	6.0	88.0	207.0	2.1	8.54	736.5	970.0
20	29/ 7/76	0.00	216.0	25.4	114.0	23.2	382.0	0.0	163.0	338.0	5.1	8.43	1266.7	1570.0
20	26/ 8/76	0.00	164.0	8.6	69.0	18.2	197.0	19.2	127.0	240.0	2.2	8.60	845.2	1170.0
20	4/10/76	0.00	244.0	11.7	124.0	27.8	232.0	15.6	209.0	447.0	1.5	8.31	1312.6	1760.0
20	2/11/76	0.00	310.0	12.5	137.0	31.7	262.0	12.0	244.0	540.0	1.8	8.61	1551.0	2030.0
20	7/12/76	0.00	316.0	12.1	145.0	31.5	298.0	16.8	245.0	536.0	1.5	8.43	1601.9	2090.0
20	10/ 1/77	0.00	302.5	12.9	131.5	30.4	275.8	19.2	274.1	478.4	1.5	8.31	1526.1	2120.0
20	3/ 2/77	0.00	356.0	11.7	120.8	31.9	245.3	10.8	299.3	516.3	0.9	8.63	1593.0	2460.0
20	4/ 3/77	0.00	461.1	10.6	118.4	32.5	256.2	36.0	369.1	666.7	1.0	8.79	1951.6	2750.0
20	14/ 4/77	0.00	249.8	9.4	90.2	21.0	185.5	31.2	213.1	350.1	0.5	8.68	1150.8	1700.0
20	9/ 5/77	0.00	193.4	9.8	90.6	20.3	208.7	21.6	161.7	326.6	0.3	8.61	1032.9	1480.0
20	7/ 6/77	0.00	176.9	9.4	85.2	18.5	220.9	9.6	144.3	282.4	0.0	8.36	947.2	1340.0
20	11/ 7/77	0.00	177.3	10.2	80.6	18.6	201.3	16.8	135.5	311.2	0.1	8.32	951.6	1370.0
20	9/ 8/77	0.00	136.6	9.4	70.7	15.0	186.7	13.2	102.1	240.2	0.5	8.76	774.3	1130.0
20	8/ 9/77	0.00	134.3	8.2	87.4	18.5	203.8	12.0	77.7	305.5	1.8	8.44	849.1	1290.0
20	9/10/77	0.00	431.9	11.3	73.1	31.4	314.8	0.0	301.4	586.0	0.9	8.13	1750.9	0.0
20	6/11/77	0.00	369.8	10.9	116.4	29.2	306.3	0.0	269.9	566.8	1.5	8.20	1670.8	2380.0

SEE PRECEDING TABLES FOR FLOW RECORDS. IF NOT LISTED THERE, THEN THEY ARE CURRENTLY UNAVAILABLE, OR WERE NOT RECORDED.

ION CONCENTRATION VALUES OF ZERO INDICATE THE INFORMATION IS NOT AVAILABLE.

INFORMATION SOURCE: NMIMT, SOCORRO; AND NMSU, LAS CRUCES.

TABLE A-12. GROUNDWATER SAMPLE LOCATIONS TAKEN DURING THIS PROJECT STUDY

Site #	Well #	Name	USGS Location	Remarks
1	USBR #26		22S.1E.09.241	
2	USBR #20		22S.1E.09.333	
3	USBR #19		22S.1E.16.433	
4	USBR #18		22S.1E.35.343	WL only
5	USGS-Well Nest	Highway 70 N.	23S.1E.10.134	North Well
6	USBR #16		23S.1E.16.211	
7	USGS-Well Nest	Firehouse	23S.1E.13.411	South Well
8	USBR #12		23S.1E.16.424	
9	USGS-Well Nest	USBR yard	23S.2E.18.313	North Well
10	USGS-Well Nest	Harris Farms	23S.1E.34.423	South Well
11	USBR #13		24S.2E.08.434	
12	USBR #14		24S.2E.09.433	
13	USBR #8		24S.2E.28.331	
14	USBR #7		25S.2E.04.114	
15	USBR #6		25S.2E.23.212	
16	USBR #24		25S.3E.20.321	
17	USBR #5		25S.2E.25.322	
18	USGS-Well Nest	Berino East	26S.3E.03.344	2nd well from east
19	USBR #22		26S.3E.09.212	
20	USGS-Well Nest	Berino West	26S.2E.12.421	Middle Well
21	USBR #28		26S.3E.15.112	WL only
22	USBR #39		26S.3E.32.441	
23	USBR #29		27S.3E.02.112	
24	USBR #1		27S.3E.28.314	
25	USBR #2		27S.3E.32.231	
26	USBR #7		28S.3E.11.311	
27	USBR #36		28S.3E.15.122	
28	USBR #33		28S.3E.24.323	
29	USBR #34		29S.4E.06.243	

TABLE A-13. DEPTH-TO-WATER AND GROUNDWATER QUALITY DATA, MESILLA VALLEY

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
1	20/11/75	10.13	170.0	13.3	93.0	15.5	367.0	0.0	99.0	240.0	0.1	7.43	997.9	1330.0
1	15/ 1/76	10.81	264.0	12.5	144.0	21.5	814.0	0.0	80.0	292.0	0.0	7.43	1628.0	1930.0
1	26/ 2/76	11.26	322.0	12.9	78.0	33.2	683.0	0.0	93.0	318.0	0.1	7.67	1540.2	1740.0
1	2/ 4/76	11.20	337.0	14.5	61.0	28.9	581.0	0.0	112.0	373.0	0.0	7.91	1507.4	1850.0
1	30/ 4/76	11.05	337.0	14.5	52.0	26.6	608.0	0.0	107.0	346.0	0.2	7.30	1491.3	1900.0
1	17/ 5/76	10.66	289.0	16.4	37.0	23.0	359.0	0.0	111.0	383.0	0.0	7.79	1218.4	1680.0
1	24/ 6/76	9.96	287.0	16.0	141.0	23.5	689.0	0.0	105.0	357.0	0.4	8.11	1618.9	1440.0
1	29/ 7/76	9.45	292.0	16.0	129.0	23.6	666.0	0.0	103.0	348.0	1.8	7.87	1579.4	1570.0
1	26/ 8/76	9.63	276.0	17.2	51.0	23.2	395.0	0.0	116.0	373.0	0.5	7.99	1251.9	1600.0
1	4/10/76	9.39	274.0	15.6	70.0	22.9	436.0	8.4	101.0	334.0	0.2	8.35	1262.1	1350.0
1	2/11/76	9.88	285.0	14.5	89.0	24.9	489.0	19.2	101.0	361.0	0.0	8.01	1383.6	1720.0
1	7/12/76	10.31	276.0	13.3	115.0	24.1	594.0	0.0	102.0	309.0	0.1	7.40	1433.5	1590.0
1	10/ 1/77	10.64	261.7	14.1	101.8	22.5	550.3	0.0	114.5	332.4	0.0	7.35	1397.4	1540.0
1	3/ 2/77	10.99	222.9	14.5	97.4	22.6	428.3	0.0	110.3	315.6	0.2	8.08	1211.6	1600.0
1	3/ 3/77	11.26	264.3	14.1	79.0	23.3	477.1	0.0	112.8	335.2	0.6	7.97	1306.4	1590.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; AND NHSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/I	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
2	15/ 1/76	8.33	150.0	11.3	161.0	25.0	379.0	0.0	129.0	321.0	4.2	7.40	1180.5	1560.0
2	26/ 2/76	9.18	119.0	14.1	80.0	30.5	158.0	0.0	142.0	280.0	1.2	7.75	824.0	1210.0
2	2/ 4/76	8.37	122.0	11.3	68.0	27.6	122.0	0.0	139.0	272.0	4.3	7.91	766.2	1120.0
2	30/ 4/76	8.06	134.0	11.0	70.0	27.5	126.0	0.0	137.0	261.0	0.3	7.73	766.8	1170.0
2	17/ 5/76	7.69	132.0	11.7	77.0	29.5	144.0	0.0	151.0	297.0	0.2	8.01	842.4	1230.0
2	24/ 6/76	6.67	141.0	11.3	81.0	29.2	151.0	0.0	155.0	281.0	2.0	8.22	851.5	1180.0
2	29/ 7/76	6.34	159.0	12.9	66.0	28.6	136.7	0.0	156.0	265.0	3.4	8.11	827.6	1240.0
2	26/ 8/76	7.26	166.0	14.5	66.0	30.8	143.0	0.0	165.0	329.0	1.2	8.31	915.5	1230.0
2	4/10/76	7.00	158.0	13.7	41.0	25.5	123.0	0.0	141.0	257.0	0.2	8.23	759.4	1070.0
2	2/11/76	7.63	152.0	14.1	128.0	27.0	139.0	14.4	157.0	396.0	0.1	8.27	1027.6	1380.0
2	7/12/76	8.11	165.0	12.9	103.0	28.0	111.0	0.0	177.0	363.0	0.2	7.60	960.1	1320.0
2	10/ 1/77	8.33	166.3	12.1	79.4	27.4	123.2	0.0	169.1	348.7	0.1	7.55	926.3	1220.0
2	3/ 2/77	8.22	151.1	9.4	79.8	26.4	145.2	0.0	164.9	301.1	0.5	8.50	878.4	1340.0
2	3/ 3/77	8.80	161.9	10.9	28.3	52.5	153.7	0.0	174.5	344.9	0.2	8.39	926.9	1410.0
2	14/ 4/77	9.45	173.9	12.5	58.3	23.6	150.1	0.0	154.6	299.7	1.3	7.86	874.0	1300.0
2	9/ 5/77	9.82	147.2	9.8	165.5	31.0	268.4	0.0	134.4	445.7	2.0	8.06	1204.0	1630.0
2	7/ 6/77	9.63	151.6	9.8	55.5	22.1	126.9	0.0	132.6	274.7	0.8	7.43	774.0	1500.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
3	20/11/75	10.23	128.0	14.1	93.0	14.3	162.0	0.0	129.0	249.0	0.1	8.13	789.5	1100.0
3	15/ 1/76	10.67	189.0	10.6	76.0	16.6	33.0	0.0	191.0	352.0	0.0	8.39	860.2	1350.0
3	26/ 2/76	10.89	128.0	10.2	79.0	21.1	23.0	0.0	127.0	356.0	0.1	8.29	744.4	1190.0
3	2/ 4/76	10.47	135.0	10.6	86.0	26.4	36.0	0.0	131.0	390.0	0.3	7.51	815.3	1250.0
3	30/ 4/76	9.92	140.0	9.8	91.0	29.4	54.0	0.0	139.0	394.0	0.2	8.09	857.4	1330.0
3	17/ 5/76	9.45	154.0	10.2	105.0	27.5	110.0	0.0	128.0	435.0	0.0	8.23	969.7	1340.0
3	24/ 6/76	9.42	139.0	8.6	101.0	25.5	118.0	0.0	125.0	407.0	0.0	8.12	924.1	1300.0
3	29/ 7/76	9.28	159.0	7.8	122.0	28.3	154.0	0.0	124.0	442.0	0.1	8.01	1037.2	1400.0
3	26/ 8/76	9.06	161.0	9.0	120.0	28.1	167.0	9.6	133.0	444.0	2.7	8.47	1074.3	1380.0
3	4/10/76	9.52	155.0	8.2	139.0	28.3	186.0	12.0	126.0	435.0	0.4	8.56	1089.9	1380.0
3	2/11/76	9.96	166.0	9.0	148.0	31.0	177.0	20.4	135.0	475.0	0.2	8.47	1161.6	1450.0
3	7/12/76	10.43	164.0	8.2	160.0	30.1	253.0	0.0	132.0	444.0	0.3	7.62	1191.6	1500.0
3	10/ 1/77	10.74	155.3	9.4	150.3	30.6	218.4	0.0	131.6	456.3	0.3	7.77	1152.1	1410.0
3	3/ 2/77	11.01	147.2	9.0	151.1	30.3	220.9	13.2	134.4	394.3	0.5	8.63	1100.8	1580.0
3	3/ 3/77	11.44	152.9	9.8	145.7	29.2	214.8	12.0	137.2	449.6	0.6	8.55	1151.8	1590.0
3	14/ 4/77	11.51	155.9	9.8	148.7	29.2	237.9	0.0	135.8	447.6	1.5	7.93	1166.5	1600.0
3	9/ 5/77	11.39	162.6	13.7	59.5	23.6	170.8	0.0	141.1	288.2	1.2	8.01	860.7	1290.0
3	7/ 6/77	11.50	155.3	9.8	161.7	29.4	277.0	0.0	141.5	453.4	0.8	7.88	1228.8	1690.0
3	11/ 7/77	11.20	153.2	9.8	170.7	32.6	255.0	15.6	138.6	451.5	0.3	8.14	1227.3	1680.0
3	9/ 8/77	11.32	163.1	10.9	151.5	32.2	300.2	0.0	145.4	441.9	0.4	8.39	1245.6	1700.0
3	8/ 9/77	10.93	162.4	12.9	166.7	32.1	239.2	16.8	148.2	440.0	0.8	8.41	1219.0	1670.0
3	13/10/77	11.48	171.6	9.4	151.7	31.0	258.1	0.0	144.3	438.0	0.3	7.72	1204.4	1790.0
3	10/11/77	12.00	195.7	15.6	169.5	36.6	286.7	0.0	163.5	488.0	0.4	7.67	1356.1	1750.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
5	16/ 1/76	0.00	122.0	9.4	95.0	17.9	217.0	0.0	91.0	300.0	0.0	7.97	852.3	1170.0
5	26/ 2/76	3.61	93.0	9.0	75.0	14.5	223.0	0.0	60.0	170.0	0.7	8.02	645.2	850.0
5	2/ 4/76	2.24	103.0	8.2	65.0	12.6	223.0	13.8	58.0	170.0	0.1	8.27	653.7	760.0
5	30/ 4/76	1.78	104.0	8.2	66.0	12.8	210.0	0.0	83.0	146.0	0.3	7.84	630.3	770.0
5	17/ 5/76	1.79	80.0	8.2	57.0	10.9	178.0	7.4	49.0	141.0	0.3	8.44	531.8	720.0
5	24/ 6/76	2.17	86.0	7.4	50.0	9.7	168.0	6.0	49.0	142.0	0.7	8.48	518.8	680.0
5	29/ 7/76	2.78	92.0	7.0	56.0	10.9	204.0	0.0	54.0	132.0	0.9	8.33	556.8	730.0
5	26/ 8/76	2.16	98.0	7.4	53.0	10.1	172.0	15.6	50.0	156.0	1.3	8.61	563.4	690.0
5	4/10/76	3.81	96.0	7.0	49.0	9.8	181.0	10.8	50.0	155.0	0.0	8.49	558.7	680.0
5	3/11/76	3.96	108.0	7.8	55.0	10.8	176.0	14.4	73.0	167.0	0.1	8.49	612.1	780.0
5	7/12/76	4.09	117.0	7.0	48.0	9.5	206.0	0.0	59.0	161.0	0.2	7.94	607.7	750.0
5	10/ 1/77	4.20	89.2	7.4	48.7	9.5	191.6	0.0	44.7	144.1	0.0	7.90	535.2	670.0
5	3/ 2/77	4.25	82.3	7.4	51.7	10.5	181.8	7.2	45.4	144.1	0.2	8.73	530.6	720.0
5	3/ 3/77	4.34	92.2	7.4	49.1	9.4	195.2	0.0	46.8	162.8	0.2	8.61	563.2	750.0
5	9/ 5/77	3.21	90.6	8.6	53.7	11.8	190.4	0.0	55.3	167.1	0.3	8.19	577.8	770.0
5	7/ 6/77	3.00	108.8	9.4	72.1	14.5	200.1	0.0	83.0	199.8	0.5	7.54	688.2	950.0
5	11/ 7/77	3.29	108.6	9.8	68.5	13.6	179.4	6.0	89.4	203.6	0.1	8.07	679.0	980.0
5	9/ 8/77	2.30	107.4	9.8	72.1	14.3	184.3	0.0	110.6	192.1	0.0	8.41	690.7	1000.0
5	8/ 9/77	2.93	121.0	12.1	117.4	23.2	158.6	14.4	155.0	251.7	1.0	8.37	854.4	1280.0
5	13/10/77	4.20	115.9	10.9	105.4	20.6	213.5	0.0	113.5	240.2	0.2	7.59	820.1	1210.0
5	10/11/77	4.39	85.6	9.4	88.2	17.0	206.2	0.0	84.4	190.2	0.4	7.83	681.4	950.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
6	18/ 9/75	9.84	372.0	11.3	249.0	43.7	415.0	0.0	314.0	693.0	0.0	8.04	2098.0	2640.0
6	21/11/75	10.71	315.0	10.0	166.0	46.6	255.0	0.0	301.0	625.0	0.5	7.58	1727.1	2340.0
6	15/ 1/76	10.56	322.0	12.5	209.0	43.0	436.0	0.0	272.0	634.0	0.0	7.45	1928.5	2720.0
6	26/ 2/76	10.54	348.0	11.3	137.0	41.1	327.0	0.0	278.0	566.0	1.0	7.78	1709.4	2390.0
6	2/ 4/76	10.52	344.0	11.3	130.0	45.7	282.0	0.0	286.0	583.0	0.1	7.94	1682.1	2370.0
6	30/ 4/76	10.71	386.0	11.3	125.0	40.7	370.0	0.0	274.0	590.0	0.3	7.49	1797.3	2420.0
6	17/ 5/76	10.41	302.0	13.7	137.0	42.1	150.0	0.0	287.0	654.0	0.1	7.95	1585.9	2400.0
6	24/ 6/76	10.01	320.0	12.9	199.0	41.2	380.0	0.0	297.0	682.0	1.2	8.08	1933.3	2300.0
6	29/ 7/76	10.04	363.0	13.7	152.0	51.7	351.0	0.0	298.0	651.0	1.9	7.92	1862.3	2540.0
6	26/ 8/76	9.98	356.0	15.3	142.0	46.6	459.0	0.0	316.0	765.0	2.8	8.08	2102.7	2410.0
6	4/10/76	9.42	98.0	24.6	67.0	16.0	143.0	12.0	79.0	219.0	2.0	8.32	660.6	860.0
6	3/11/76	8.79	263.0	21.1	138.0	35.4	217.0	14.4	224.0	557.0	0.0	8.19	1470.0	1850.0
6	7/12/76	9.03	343.0	16.4	180.0	44.6	288.0	0.0	299.0	682.0	0.0	7.67	1853.1	2390.0
6	10/ 1/77	9.17	357.4	16.4	231.9	48.6	366.1	0.0	319.1	816.5	0.0	7.56	2156.1	2560.0
6	3/ 2/77	9.25	330.5	15.2	168.1	46.2	211.1	0.0	311.7	725.7	0.3	8.38	1808.9	2570.0
6	3/ 3/77	9.49	355.1	14.8	185.4	48.0	252.6	0.0	320.9	833.8	0.2	8.20	2010.4	2700.0
6	14/ 4/77	9.52	323.4	14.5	133.9	49.4	148.9	0.0	279.8	749.3	0.2	7.78	1699.1	2520.0
6	9/ 5/77	9.53	362.0	15.6	134.7	48.5	153.7	0.0	308.1	758.9	0.1	8.19	1781.7	2550.0
6	7/ 6/77	10.44	362.7	14.9	152.7	48.2	196.5	0.0	313.1	806.9	0.1	8.01	1895.0	2670.0
6	11/ 7/77	10.92	361.1	14.1	156.3	50.1	168.4	8.4	302.8	835.7	0.1	8.08	1897.0	2650.0
6	9/ 8/77	10.90	353.5	14.5	139.3	44.1	183.0	0.0	300.0	763.7	0.0	8.43	1798.1	2560.0
6	8/ 9/77	10.29	371.5	13.3	142.4	42.0	201.3	0.0	302.1	689.7	0.0	7.99	1762.0	2560.0
6	13/10/77	10.45	353.3	12.1	140.7	43.9	185.5	0.0	294.3	749.3	0.1	7.35	1779.1	2690.0
6	10/11/77	10.28	353.3	14.1	147.9	44.1	195.2	0.0	284.0	734.9	0.2	7.41	1773.7	2750.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
8	15/ 1/76	14.17	206.0	12.5	117.0	23.5	666.0	0.0	66.0	228.0	0.2	7.62	1319.2	1540.0
8	26/ 2/76	14.78	336.0	14.5	58.0	34.0	640.0	0.0	133.0	344.0	2.0	7.90	1561.5	1870.0
8	2/ 4/76	13.49	293.0	14.9	53.0	32.0	454.0	0.0	141.0	362.0	0.7	8.35	1350.6	1870.0
8	30/ 4/76	13.67	269.0	13.3	39.0	19.9	380.0	0.0	110.0	305.0	1.1	7.73	1137.3	1580.0
8	17/ 5/76	13.65	206.0	11.3	22.0	12.4	177.0	17.4	84.0	269.0	0.6	8.55	799.7	1310.0
8	24/ 6/76	14.12	203.0	10.2	79.0	12.8	461.0	0.0	73.0	232.0	2.0	8.27	1073.0	1040.0
8	29/ 7/76	13.30	215.0	11.0	76.0	15.1	447.0	0.0	101.0	225.0	7.1	7.82	1097.2	1230.0
8	26/ 8/76	13.00	220.0	13.7	36.0	21.6	199.0	0.0	154.0	296.0	2.3	8.24	942.6	1330.0
8	4/10/76	12.56	253.0	16.8	88.0	30.4	348.0	0.0	170.0	414.0	0.5	7.98	1320.7	1750.0
8	3/11/76	13.18	89.0	8.6	86.0	22.1	183.0	16.8	117.0	173.0	0.0	8.44	695.5	940.0
8	7/12/76	13.32	165.0	9.4	120.0	22.9	509.0	0.0	80.0	225.0	0.0	7.45	1131.4	1250.0
8	10/ 1/77	13.68	199.2	11.3	104.2	18.0	519.8	0.0	67.0	224.3	0.0	7.76	1143.9	1200.0
8	3/ 2/77	13.88	160.5	10.2	91.2	15.8	395.3	19.2	64.5	193.6	0.2	8.89	950.5	1220.0
8	3/ 3/77	13.94	186.8	11.3	88.0	14.2	364.8	37.2	73.4	235.8	0.3	8.78	1011.8	1280.0
8	14/ 4/77	14.70	169.3	10.6	91.8	13.9	440.5	0.0	66.3	220.9	0.3	8.01	1013.5	1250.0
8	9/ 5/77	13.96	181.2	11.3	78.0	16.9	400.2	31.2	63.5	220.9	0.1	8.33	1003.3	1230.0
8	7/ 6/77	14.00	156.9	10.6	85.0	13.0	433.2	0.0	58.9	201.7	0.4	8.12	959.6	1160.0
8	11/ 7/77	14.16	123.7	9.8	96.8	15.2	366.1	21.6	56.0	186.4	0.1	8.18	875.7	1110.0
8	9/ 8/77	15.73	107.4	9.4	102.0	15.6	311.2	0.0	69.1	197.9	0.0	8.42	812.6	1090.0
8	8/ 9/77	14.29	103.5	12.9	109.2	16.8	306.3	16.8	74.8	196.0	0.1	8.31	836.4	1060.0
8	13/10/77	13.70	116.6	8.2	110.2	16.3	301.4	0.0	79.1	228.6	0.1	7.67	860.5	1170.0
8	10/11/77	13.27	130.4	9.8	131.9	20.8	334.3	0.0	101.8	274.7	0.4	7.50	1004.1	1200.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
9	18/ 9/75	24.57	145.0	9.8	202.0	24.9	399.0	0.0	97.0	427.0	0.0	8.16	1304.7	1560.0
9	16/ 1/76	0.00	179.0	9.4	210.0	27.6	450.0	0.0	104.0	449.0	0.0	7.86	1429.0	1770.0
9	26/ 2/76	26.72	123.0	12.5	170.0	24.9	162.0	0.0	101.0	491.0	12.2	7.82	1096.6	1610.0
9	2/ 4/76	27.10	138.0	11.0	141.0	32.5	207.0	0.0	104.0	0.0	0.2	7.69	633.7	1550.0
9	17/ 5/76	26.49	136.0	8.2	126.0	17.8	280.0	41.4	91.0	282.0	1.9	8.50	984.3	1210.0
9	24/ 6/76	26.62	131.0	7.4	127.0	18.1	345.0	10.8	91.0	277.0	1.1	8.64	1008.4	1190.0
9	29/ 7/76	26.55	141.0	7.0	139.0	19.6	366.0	0.0	91.0	275.0	2.3	7.96	1040.9	1220.0
9	26/ 8/76	26.77	147.0	8.2	128.0	20.3	264.0	46.8	99.0	311.0	0.5	8.77	1024.8	1230.0
9	4/10/76	26.46	149.0	8.2	136.0	19.2	288.0	37.2	97.0	313.0	1.0	8.69	1048.7	1230.0
9	2/11/76	26.45	155.0	7.8	141.0	20.2	284.0	36.0	98.0	327.0	1.3	8.70	1070.3	1290.0
9	7/12/76	26.57	159.0	7.4	143.0	19.7	338.0	9.6	94.0	327.0	0.3	7.74	1098.0	1300.0
9	10/ 1/77	26.66	147.4	8.2	134.7	19.0	346.5	0.0	92.2	324.7	0.3	7.64	1072.9	1220.0
9	3/ 2/77	26.95	151.1	8.2	124.0	19.0	284.3	4.8	93.6	319.4	0.6	8.63	1005.1	1310.0
9	3/ 3/77	27.34	140.8	8.2	127.1	18.1	280.6	19.2	95.7	314.6	0.3	8.63	1004.6	1290.0
9	14/ 4/77	27.05	146.3	9.0	161.3	21.3	311.2	0.0	94.0	403.0	1.5	7.88	1147.4	1500.0
9	9/ 5/77	26.91	55.7	5.9	88.6	14.8	222.1	0.0	73.8	136.4	0.9	8.16	598.1	800.0
9	7/ 6/77	26.98	147.2	8.2	130.3	18.6	342.9	0.0	93.3	315.1	0.9	7.87	1056.3	1360.0
9	11/ 7/77	26.05	135.9	8.6	132.9	19.5	303.8	19.2	90.8	318.9	2.2	8.20	1031.7	1310.0
9	9/ 8/77	27.37	138.0	8.6	126.3	17.0	298.9	19.2	89.0	313.2	1.5	8.50	1011.7	1290.0
9	8/ 9/77	27.26	144.4	7.8	129.3	19.0	274.5	24.0	86.9	307.4	0.2	8.53	993.5	1340.0
9	13/10/77	27.52	143.3	7.4	123.8	18.4	319.7	0.0	85.1	309.3	0.2	7.63	1007.2	1380.0
9	10/11/77	27.27	153.4	10.9	128.1	20.4	336.8	0.0	102.8	317.0	0.5	7.81	1070.0	1400.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
10	16/ 1/76	0.00	84.0	6.7	56.0	10.9	254.0	0.0	45.0	136.0	0.0	7.80	592.6	770.0
10	2/ 4/76	2.28	103.0	8.2	67.0	14.2	279.0	0.0	55.0	113.0	15.0	8.54	654.4	770.0
10	30/ 4/76	1.86	90.0	6.7	60.0	13.0	265.0	0.0	48.0	96.0	5.6	7.51	584.3	730.0
10	17/ 5/76	1.96	86.0	7.8	50.0	11.3	214.0	19.5	44.0	107.0	22.0	8.55	561.6	680.0
10	24/ 6/76	1.91	81.0	7.8	61.0	12.9	203.0	6.0	70.0	121.0	5.8	8.57	560.5	720.0
10	29/ 7/76	2.43	83.0	8.6	63.0	13.6	194.0	0.0	66.0	133.0	16.1	8.28	577.3	770.0
10	26/ 8/76	1.95	74.0	8.6	58.0	12.6	159.0	9.6	48.0	148.0	21.8	9.54	539.6	640.0
10	4/10/76	3.73	78.0	7.8	62.0	12.3	171.0	12.0	46.0	153.0	26.1	8.45	568.2	690.0
10	3/11/76	4.16	75.0	7.4	67.0	14.5	184.0	13.2	46.0	158.0	95.0	8.34	660.1	720.0
10	7/12/76	4.35	77.0	6.6	67.0	13.9	199.0	0.0	47.0	159.0	10.0	7.74	579.5	710.0
10	11/ 1/77	4.63	72.9	7.0	79.4	16.2	203.8	0.0	47.2	182.5	9.5	7.64	618.4	700.0
10	3/ 2/77	4.67	74.8	7.0	60.7	12.4	202.6	0.0	49.3	135.0	10.0	8.55	551.7	750.0
10	1/ 3/77	4.82	83.9	7.8	76.2	15.8	180.6	13.2	67.0	189.2	0.3	8.50	634.0	990.0
10	14/ 4/77	3.63	116.4	8.2	86.4	18.5	189.1	21.6	105.0	220.0	12.5	8.48	777.7	1100.0
10	9/ 5/77	3.49	118.7	11.7	98.4	20.4	223.3	0.0	122.3	244.0	0.5	8.25	839.4	1210.0
10	7/ 6/77	3.22	119.8	10.6	151.9	31.3	288.0	0.0	170.6	290.1	0.8	8.01	1062.9	1480.0
10	11/ 7/77	3.30	99.8	9.8	102.6	21.6	240.4	0.0	112.8	244.0	2.5	8.06	833.5	1190.0
10	9/ 8/77	2.69	93.8	8.2	69.9	15.1	192.8	3.6	84.4	178.7	2.0	8.45	648.5	930.0
10	8/ 9/77	2.84	102.6	7.4	66.1	13.5	200.1	6.0	76.9	171.0	0.7	8.39	644.4	830.0
10	13/10/77	4.58	94.5	7.8	95.2	18.5	196.5	0.0	97.5	199.8	0.6	7.71	710.4	1070.0
10	10/11/77	4.85	115.5	7.4	50.5	9.8	219.6	0.0	58.9	160.4	8.6	7.97	630.8	875.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/T	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
11	21/11/75	11.94	99.0	9.4	90.0	13.6	112.0	0.0	176.0	162.0	0.5	7.23	662.5	950.0
11	15/ 1/76	12.46	111.0	8.6	84.0	14.8	214.0	0.0	82.0	198.0	0.5	7.49	712.9	1090.0
11	26/ 2/76	12.56	100.0	8.2	67.0	15.0	143.0	0.0	80.0	213.0	0.9	7.86	627.1	890.0
11	31/ 3/76	11.86	101.0	8.6	60.0	15.7	136.0	0.0	85.0	208.0	0.6	8.18	614.9	880.0
11	29/ 4/76	11.40	110.0	8.2	70.0	16.5	168.0	0.0	88.0	205.0	0.4	7.49	666.1	920.0
11	17/ 5/76	11.18	111.0	7.8	73.0	15.7	162.0	20.7	78.0	217.0	0.2	8.47	685.4	970.0
11	24/ 6/76	10.98	110.0	7.8	79.0	16.5	196.0	4.8	79.0	236.0	2.5	8.51	731.6	940.0
11	29/ 7/76	11.02	113.0	7.0	94.0	19.3	197.0	0.0	85.0	250.0	2.9	8.19	768.2	1040.0
11	26/ 8/76	10.97	110.0	7.4	79.0	17.5	161.0	26.4	85.0	233.0	2.3	8.55	721.6	940.0
11	4/10/76	10.59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0
11	3/11/76	11.26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0
11	7/12/76	11.54	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0
11	10/ 1/77	11.81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0
11	3/ 2/77	11.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/1	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
12	15/ 1/76	13.13	126.0	9.8	99.0	17.8	349.0	0.0	71.0	215.0	0.0	7.51	887.6	1190.0
12	26/ 2/76	13.04	107.0	9.8	77.0	20.0	242.0	0.0	77.0	213.0	0.0	7.83	745.8	880.0
12	31/ 3/76	12.48	135.0	9.0	85.0	23.0	224.0	32.4	86.0	253.0	0.2	8.48	847.6	1110.0
12	29/ 4/76	12.35	140.0	9.0	80.0	23.0	268.0	0.0	86.0	256.0	0.5	7.55	862.5	1160.0
12	17/ 5/76	12.47	123.0	7.0	61.0	21.0	113.0	6.0	96.0	298.0	0.1	8.53	725.1	1080.0
12	24/ 6/76	12.89	126.0	8.6	83.0	22.7	177.0	3.6	104.0	273.0	2.1	8.46	800.0	1080.0
12	29/ 7/76	12.65	142.0	8.2	75.0	24.4	143.0	0.0	112.0	304.0	1.8	8.09	810.4	1180.0
12	26/ 8/76	12.63	141.0	8.6	55.0	22.7	125.0	0.0	110.0	294.0	5.4	8.34	761.7	1010.0
12	4/10/76	12.42	148.0	8.6	103.0	27.4	148.0	8.4	115.0	363.0	0.0	8.29	921.5	1210.0
12	2/11/76	12.74	166.0	10.6	159.0	34.6	189.0	22.8	126.0	517.0	0.1	8.10	1225.1	1540.0
12	7/12/76	12.92	168.0	9.4	142.0	32.2	217.0	0.0	123.0	465.0	0.0	8.02	1156.7	1440.0
12	10/ 1/77	13.12	162.4	10.2	83.2	29.2	108.6	0.0	118.4	417.9	0.0	8.05	929.8	1210.0
12	3/ 2/77	13.29	170.2	9.4	118.4	27.4	200.1	0.0	143.6	403.5	0.3	8.48	1072.8	1580.0
12	3/ 3/77	13.56	150.6	9.8	135.7	30.4	197.7	9.6	123.0	464.5	0.2	8.44	1121.5	1530.0
12	14/ 4/77	14.57	144.7	10.2	63.3	29.7	73.2	0.0	122.3	382.3	0.3	8.13	826.0	1250.0
12	9/ 5/77	15.22	157.6	11.3	77.0	30.5	98.8	0.0	120.2	420.7	0.0	8.21	916.2	1340.0
12	7/ 6/77	15.95	166.8	10.6	83.2	33.2	119.6	0.0	128.7	443.8	0.1	7.95	985.8	1440.0
12	11/ 7/77	16.71	183.5	10.2	69.9	29.7	123.2	0.0	118.4	430.3	0.1	8.10	965.4	1400.0
12	9/ 8/77	17.50	170.2	10.6	78.0	27.0	146.4	0.0	116.3	396.7	0.0	8.40	945.2	1380.0
12	8/ 9/77	17.91	190.4	9.0	52.3	27.2	155.0	0.0	110.6	377.5	0.7	8.28	922.8	1290.0
12	13/10/77	17.89	192.7	8.6	35.7	21.0	156.2	0.0	101.8	342.0	0.2	8.34	858.2	1260.0
12	10/11/77	18.02	203.3	10.6	37.5	21.9	171.4	0.0	100.4	349.7	0.3	8.16	894.9	1200.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.

INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
13	21/11/75	12.45	180.0	23.9	27.0	7.4	339.0	20.4	131.0	28.0	0.4	8.48	757.1	1030.0
13	15/ 1/76	12.96	341.0	18.0	24.0	17.9	579.0	0.0	111.0	272.0	0.3	7.93	1363.2	1740.0
13	27/ 2/76	12.82	295.0	19.6	54.0	54.3	169.0	0.0	280.0	470.0	5.5	7.76	1347.4	2080.0
13	31/ 3/76	12.56	311.0	17.2	74.0	63.9	116.0	0.0	318.0	553.0	1.1	8.21	1454.2	2180.0
13	29/ 4/76	11.85	332.0	17.2	92.0	58.0	128.0	0.0	314.0	608.0	0.2	7.77	1549.4	2310.0
13	17/ 5/76	11.47	333.0	19.2	102.0	43.3	156.0	0.0	273.0	616.0	0.8	8.41	1543.3	2320.0
13	25/ 6/76	11.64	307.0	14.5	79.0	34.8	185.0	0.0	217.0	513.0	0.3	8.34	1350.6	1900.0
13	30/ 7/76	12.70	202.0	10.6	31.0	17.3	125.0	4.8	114.0	238.0	5.8	8.31	748.5	1170.0
13	27/ 8/76	11.41	182.0	11.0	25.0	17.5	188.0	10.8	108.0	225.0	1.5	8.62	768.9	950.0
13	4/10/76	11.86	131.0	9.0	24.0	13.7	155.0	10.8	88.0	159.0	0.0	8.46	590.5	800.0
13	2/11/76	12.30	127.0	8.6	95.0	16.3	128.0	18.0	99.0	332.0	0.0	8.16	823.9	1040.0
13	8/12/76	12.73	133.0	8.6	80.0	16.4	94.0	0.0	126.0	292.0	0.0	7.34	750.1	1040.0
13	11/ 1/77	12.94	128.8	11.7	54.5	16.9	92.7	0.0	114.5	273.8	0.4	7.57	693.3	920.0
13	4/ 2/77	13.04	119.1	9.0	33.7	12.2	129.3	0.0	93.3	160.4	0.3	8.83	557.2	880.0
13	4/ 3/77	13.09	121.7	9.0	20.8	16.5	122.0	0.0	86.9	144.1	0.1	8.35	521.1	770.0
13	15/ 4/77	12.00	119.1	7.8	11.6	7.4	111.0	0.0	82.3	123.4	4.5	8.36	467.2	710.0
13	10/ 5/77	11.56	129.5	10.9	35.7	10.7	126.9	7.2	85.8	169.1	1.0	8.47	576.8	850.0
13	8/ 6/77	11.01	138.5	9.4	26.5	13.6	144.0	4.8	94.0	188.3	0.3	8.32	619.2	920.0
13	12/ 7/77	11.16	132.9	8.2	18.8	12.4	158.6	0.0	81.2	155.6	0.2	8.24	569.0	1000.0
13	10/ 8/77	10.78	122.8	9.0	19.6	12.2	117.1	7.2	87.6	151.8	0.3	8.66	5[illegible]7.6	800.0
13	9/ 9/77	11.19	98.0	6.6	34.9	12.5	133.0	0.0	105.3	111.4	0.2	8.26	502.0	830.0
13	13/10/77	11.85	89.9	7.0	34.1	14.2	115.9	0.0	108.2	106.6	0.3	7.63	476.3	810.0
13	10/11/77	12.43	122.1	7.8	35.3	12.8	126.9	0.0	124.5	151.8	0.4	7.83	501.5	800.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/I	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
14	15/ 1/76	12.88	224.0	10.6	8.0	1.0	103.0	62.1	175.0	110.0	1.1	9.61	694.8	1170.0
14	27/ 2/76	12.34	276.0	11.0	32.0	10.7	153.0	0.0	178.0	378.0	0.3	8.01	1039.0	1640.0
14	31/ 3/76	12.15	285.0	25.0	50.0	18.8	154.0	0.0	199.0	404.0	3.8	8.32	1139.6	1640.0
14	29/ 4/76	0.00	280.0	19.6	55.0	29.2	181.0	0.0	200.0	410.0	0.6	7.90	1175.4	1760.0
14	17/ 5/76	11.08	267.0	16.8	87.0	34.4	153.0	9.0	216.0	526.0	0.6	8.58	1304.8	1880.0
14	25/ 6/76	10.72	254.0	12.9	91.0	34.7	188.0	6.0	218.0	451.0	0.3	8.51	1255.9	1800.0
14	30/ 7/76	10.48	283.0	13.3	69.0	34.4	143.0	0.0	213.0	482.0	7.7	8.11	1245.4	1790.0
14	27/ 8/76	10.43	253.0	15.6	58.0	33.8	146.0	0.0	224.0	415.0	0.6	8.33	1146.0	1590.0
14	5/10/76	10.68	268.0	13.3	43.0	35.9	135.0	0.0	207.0	428.0	0.0	8.20	1130.2	1600.0
14	2/11/76	11.50	278.0	12.5	209.0	36.3	278.0	0.0	224.0	663.0	0.2	8.22	1700.9	2130.0
14	8/12/76	12.18	274.0	12.1	195.0	35.4	376.0	0.0	207.0	582.0	0.4	7.41	1681.9	2060.0
14	11/ 1/77	12.61	253.0	12.9	149.5	32.6	302.6	0.0	202.8	567.7	0.2	7.51	1521.3	1890.0
14	4/ 2/77	12.89	255.8	11.7	166.3	29.8	288.0	26.4	194.0	500.0	0.4	8.82	1472.4	2120.0
14	4/ 3/77	13.22	237.6	11.3	183.2	30.6	383.1	0.0	183.7	573.0	0.1	8.11	1602.7	2100.0
14	15/ 4/77	12.05	239.2	12.1	67.7	27.8	128.1	10.8	177.7	455.3	4.2	8.37	1123.0	1700.0
14	10/ 5/77	11.58	247.9	13.3	55.7	26.6	128.1	0.0	185.8	447.6	0.6	8.30	1105.7	1690.0
14	8/ 6/77	11.59	270.9	12.9	72.9	29.4	155.0	0.0	211.3	463.0	0.0	7.98	1215.6	1790.0
14	12/ 7/77	11.53	271.9	12.1	82.6	29.7	165.9	0.0	220.6	485.1	0.1	8.15	1267.9	1870.0
14	10/ 8/77	11.78	248.4	13.7	67.3	25.5	68.3	0.0	235.8	418.8	0.0	7.71	1078.0	1730.0
14	9/ 9/77	11.66	274.4	12.9	182.4	42.6	242.8	0.0	305.7	614.8	0.4	8.10	1675.9	2480.0
14	13/10/77	11.60	293.0	14.1	139.5	47.5	163.5	0.0	291.5	564.8	0.5	7.20	1514.4	2450.0
14	10/11/77	12.06	266.3	12.1	142.7	42.7	148.9	0.0	286.9	539.9	0.4	7.58	1439.9	2500.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
15	21/11/75	9.00	92.0	18.8	12.0	3.8	76.0	8.4	111.0	28.0	6.8	8.55	356.8	480.0
15	15/ 1/76	9.79	202.0	22.3	76.0	25.9	280.0	0.0	194.0	274.0	6.8	8.06	1081.0	1510.0
15	27/ 2/76	10.05	150.0	21.1	75.0	33.2	68.0	0.0	192.0	342.0	7.7	7.84	889.0	1420.0
15	31/ 3/76	9.87	181.0	18.8	48.0	29.9	68.0	0.0	178.0	313.0	1.2	8.05	837.9	1280.0
15	29/ 4/76	9.64	130.0	17.2	68.0	29.4	110.0	0.0	166.0	293.0	0.4	7.86	814.0	1290.0
15	17/ 5/76	9.16	166.0	22.7	71.0	30.9	135.0	0.0	185.0	342.0	1.8	8.30	954.4	1390.0
15	25/ 6/76	8.80	183.0	23.1	94.0	41.6	139.0	0.0	219.0	396.0	1.0	8.36	1096.7	1650.0
15	30/ 7/76	8.48	185.0	21.1	102.0	40.4	118.0	0.0	211.0	425.0	4.9	7.99	1107.4	1630.0
15	27/ 8/76	8.15	185.0	23.5	89.0	35.1	137.0	0.0	208.0	415.0	0.8	8.33	1093.4	1420.0
15	4/10/76	8.14	169.0	21.1	64.0	33.3	107.0	0.0	181.0	318.0	0.0	8.06	893.4	1300.0
15	2/11/76	9.00	162.0	18.8	187.0	33.4	161.0	6.8	206.0	513.0	0.1	8.06	1288.1	1690.0
15	8/12/76	9.73	155.0	15.6	171.0	30.5	137.0	0.0	201.0	463.0	0.6	6.95	1173.7	1570.0
15	11/ 1/77	10.19	149.0	14.5	145.7	27.0	119.6	0.0	212.4	430.8	0.1	6.69	1099.1	1500.0
15	4/ 2/77	10.47	137.5	13.7	139.1	24.9	141.5	0.0	202.1	344.9	0.4	8.55	1004.2	1590.0
15	3/ 3/77	10.97	144.9	13.3	134.9	25.8	117.1	0.0	206.7	384.2	0.7	7.79	1027.7	1570.0
15	15/ 4/77	11.00	144.9	13.3	111.4	24.8	113.5	0.0	201.8	352.1	8.0	8.16	969.7	1520.0
15	10/ 5/77	11.15	147.2	13.3	116.6	22.3	169.6	0.0	171.3	359.3	0.3	8.10	999.8	1470.0
15	8/ 6/77	11.01	155.3	12.9	124.2	23.7	148.9	0.0	180.8	359.3	0.2	7.20	1005.3	1510.0
15	12/ 7/77	8.00	146.7	13.3	116.2	22.7	147.6	0.0	162.8	347.7	0.0	7.99	957.2	1430.0
15	10/ 8/77	10.53	166.1	14.1	83.8	22.6	168.4	0.0	159.2	307.4	0.0	8.39	921.6	1360.0
15	9/ 9/77	10.47	159.4	12.9	89.2	22.9	169.6	12.0	158.5	292.0	0.2	8.39	916.7	1320.0
15	13/10/77	10.30	156.4	12.1	61.7	21.6	183.0	0.0	135.8	261.3	0.2	7.26	832.2	1240.0
15	10/11/77	11.05	153.4	11.7	57.3	19.9	196.5	0.0	127.3	245.9	0.4	7.76	812.4	1200.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.

INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/I	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
16	21/11/75	6.21	286.0	36.4	10.0	2.4	92.0	217.2	101.0	111.0	5.3	10.28	861.3	1330.0
16	15/ 1/76	8.13	406.0	24.2	2.0	0.2	204.0	141.9	127.0	335.0	0.3	9.80	1240.6	1890.0
16	26/ 2/76	7.62	275.0	69.6	8.0	2.5	225.0	25.2	131.0	353.0	6.1	9.07	1095.4	1580.0
16	31/ 3/76	6.89	242.0	61.8	25.0	15.0	153.0	14.7	127.0	360.0	0.3	8.36	998.8	1380.0
16	29/ 4/76	6.39	251.0	55.9	40.0	20.3	217.0	0.0	155.0	366.0	0.3	8.27	1105.5	1500.0
16	17/ 5/76	6.17	259.0	52.8	52.0	20.3	209.0	26.4	127.0	433.0	0.9	8.57	1180.4	1530.0
16	24/ 6/76	6.17	242.0	46.9	44.0	17.5	203.0	10.8	125.0	390.0	2.1	8.64	1081.3	1470.0
16	29/ 7/76	5.33	278.0	4.7	52.0	19.7	198.0	0.0	141.0	421.0	3.1	8.25	1117.5	1650.0
16	26/ 9/76	5.93	269.0	53.2	60.0	22.2	165.0	16.8	165.0	473.0	4.4	8.51	1228.6	1680.0
16	4/10/76	6.36	232.0	47.7	47.0	17.9	146.0	20.4	136.0	428.0	0.2	8.44	1075.2	1420.0
16	2/11/76	7.25	287.0	54.8	67.0	16.9	190.0	20.4	141.0	503.0	0.1	8.47	1280.2	1640.0
16	7/12/76	7.64	249.0	48.1	57.0	14.5	193.0	0.0	128.0	457.0	0.1	8.24	1146.7	1510.0
16	10/ 1/77	7.86	256.9	48.1	54.7	14.2	196.5	7.2	120.9	472.6	0.0	8.37	1171.1	1400.0
16	3/ 2/77	7.98	228.9	42.6	57.7	14.5	189.1	22.8	119.5	394.3	0.1	8.67	1069.5	1600.0
16	3/ 3/77	8.07	245.2	43.8	62.3	16.5	194.0	16.8	130.8	440.4	0.3	8.62	1150.2	1620.0
16	14/ 4/77	6.79	219.6	41.1	53.9	14.3	176.9	26.4	108.5	397.2	0.0	8.43	1038.1	1490.0
16	9/ 5/77	6.78	227.0	41.1	62.5	14.7	230.6	18.0	108.2	415.0	0.0	8.48	1117.1	1520.0
16	7/ 6/77	6.04	238.5	38.7	68.5	15.1	274.5	0.0	119.1	397.7	0.4	8.24	1152.6	1540.0
16	11/ 7/77	5.99	236.0	43.0	72.1	14.6	242.8	20.4	117.4	422.7	0.0	8.22	1169.0	1560.0
16	9/ 8/77	5.86	238.1	40.7	58.9	14.0	244.0	13.2	114.2	403.5	0.3	8.69	1126.7	1610.0
16	8/ 9/77	5.98	257.6	45.0	74.3	16.4	242.8	18.0	129.8	449.6	0.2	8.46	1233.7	1670.0
16	13/10/77	7.39	267.3	46.1	71.9	17.8	283.1	0.0	126.2	468.8	0.2	8.13	1281.4	1760.0
16	10/11/77	17.80	242.0	43.4	69.3	16.8	278.2	0.0	124.1	428.4	0.3	8.16	1202.5	1625.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/1	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
17	15/ 1/76	10.00	479.0	11.0	12.0	5.4	162.0	29.7	295.0	486.0	1.9	8.95	1482.0	2410.0
17	27/ 2/76	9.79	743.0	17.2	53.0	27.2	136.0	0.0	448.0	1100.0	2.3	8.56	2526.7	3690.0
17	31/ 3/76	9.05	786.0	15.3	49.0	30.2	109.0	0.0	483.0	1132.0	0.7	8.16	2605.2	3770.0
17	29/ 4/76	8.97	811.0	14.1	61.0	44.3	131.0	0.0	486.0	1225.0	1.3	8.06	2773.7	3970.0
17	17/ 5/76	8.67	869.0	20.7	65.0	47.1	156.0	16.2	460.0	1328.0	1.3	8.51	2963.3	4000.0
17	25/ 6/76	8.48	702.0	18.0	104.0	54.2	184.0	0.0	480.0	1243.0	2.1	8.38	2787.3	4030.0
17	30/ 7/76	7.64	876.0	5.5	72.0	54.0	160.0	0.0	491.0	1369.0	5.4	8.10	3032.9	4230.0
17	27/ 8/76	7.91	902.0	18.8	125.0	54.0	161.0	0.0	544.0	1460.0	5.5	8.37	3270.3	3850.0
17	4/10/76	8.65	903.0	16.0	125.0	59.0	198.0	13.2	514.0	1515.0	0.0	8.43	3343.2	4150.0
17	2/11/76	9.45	837.0	17.6	219.0	58.8	204.0	20.4	545.0	1705.0	0.0	8.16	3606.8	4540.0
17	8/12/76	9.92	864.0	16.8	175.0	48.9	125.0	0.0	535.0	1585.0	0.2	7.71	3349.9	4330.0
17	11/ 1/77	10.16	880.9	15.6	131.5	38.5	92.7	0.0	544.3	1464.4	0.1	7.69	3168.1	4040.0
17	4/ 2/77	10.30	788.4	12.9	99.8	36.6	94.0	0.0	495.7	1337.2	0.5	8.32	2865.1	4340.0
17	3/ 3/77	10.63	823.6	13.7	94.4	43.3	81.8	0.0	501.4	1456.3	0.4	8.19	3014.9	4340.0
17	15/ 4/77	10.38	828.7	12.9	82.0	43.0	53.7	0.0	188.9	472.6	3.0	7.86	1644.8	4250.0
17	10/ 5/77	10.59	833.1	11.7	84.8	41.3	59.8	0.0	491.5	1493.7	0.2	8.03	3016.1	4300.0
17	8/ 6/77	10.58	862.0	13.3	91.8	42.4	67.1	0.0	529.1	1503.3	0.1	7.69	3129.2	4390.0
17	12/ 7/77	10.76	840.7	1.2	85.2	38.2	63.5	0.0	492.9	1450.5	0.0	8.02	2972.1	4380.0
17	10/ 8/77	10.84	835.4	11.3	78.4	46.8	59.8	0.0	475.2	1527.4	0.1	8.30	3034.3	4380.0
17	9/ 9/77	10.76	835.4	11.3	76.4	46.8	59.8	0.0	475.2	1527.4	0.1	7.94	3034.3	4410.0
17	13/10/77	10.95	935.9	12.5	67.1	39.5	57.3	360.0	459.9	1671.4	0.1	8.84	3603.8	4550.0
17	10/11/77	11.00	861.3	12.9	57.3	33.6	76.9	0.0	422.0	1412.1	0.3	8.78	2876.3	4250.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
18	19/ 9/75	8.77	752.0	44.6	108.0	40.2	576.0	0.0	737.0	596.0	29.2	8.14	2883.0	3870.0
18	26/ 2/76	10.59	915.0	52.4	34.0	46.8	612.0	0.0	787.0	692.0	9.4	7.81	3148.6	4260.0
18	31/ 3/76	9.81	829.0	56.7	45.0	48.4	441.0	14.7	753.0	690.0	12.9	8.22	2890.7	4140.0
18	29/ 4/76	9.78	874.0	59.4	47.0	47.2	509.0	0.0	743.0	804.0	16.8	7.43	3100.4	4310.0
18	17/ 5/76	9.92	852.0	60.6	42.0	41.7	362.0	0.0	752.0	830.0	14.6	8.12	2954.9	4130.0
18	24/ 6/76	9.05	718.0	57.9	127.0	48.4	625.0	0.0	711.0	671.0	14.8	8.11	2973.1	3720.0
18	29/ 7/76	8.22	772.0	55.9	90.0	55.7	610.0	0.0	716.0	653.0	36.1	8.07	2988.7	4000.0
18	26/ 8/76	7.81	768.0	64.9	42.0	58.2	234.0	20.4	1023.0	634.0	6.0	8.55	2850.5	3700.0
18	4/10/76	7.84	749.0	63.0	52.0	60.4	306.0	14.4	712.0	708.0	43.6	8.88	2708.4	3870.0
18	2/11/76	9.55	698.0	60.6	178.0	68.4	486.0	58.8	725.0	797.0	27.4	8.13	3099.2	4000.0
18	7/12/76	10.05	702.0	60.6	166.0	62.2	556.0	10.8	735.0	696.0	1.5	7.45	2990.1	3930.0
18	10/ 1/77	10.33	705.4	68.8	164.5	62.3	602.8	0.0	704.2	866.9	16.5	7.69	3191.5	3790.0
18	3/ 2/77	10.49	690.5	62.6	109.4	48.9	466.1	0.0	646.8	753.1	12.5	8.08	2789.8	4170.0
18	3/ 3/77	10.58	693.5	62.6	149.3	58.0	424.6	63.6	682.6	819.4	11.5	8.70	2965.0	4190.0
18	14/ 4/77	9.40	1130.2	67.3	37.9	12.4	452.7	90.0	772.3	1105.2	17.3	8.88	3685.2	5350.0
18	9/ 5/77	9.82	1079.8	60.6	53.7	11.2	650.4	43.2	749.3	1018.2	7.0	8.60	3673.4	5080.0
18	7/ 6/77	9.78	1144.3	75.1	44.1	16.5	710.2	40.8	773.7	1090.3	19.0	8.36	3913.9	5490.0
18	11/ 7/77	8.64	1141.9	78.2	39.1	14.1	151.3	36.0	763.5	1191.1	14.6	8.28	3429.8	5610.0
18	9/ 8/77	7.68	1167.3	78.5	36.7	12.2	719.9	49.2	750.3	1138.3	42.5	8.94	3994.5	5530.0
18	8/ 9/77	7.89	682.2	61.8	165.9	64.4	519.8	22.8	723.4	706.0	1.7	8.34	2948.1	4120.0
18	13/10/77	9.45	1124.5	61.4	34.1	11.1	793.1	0.0	723.4	1061.5	0.9	8.02	3809.8	5260.0
18	10/11/77	9.82	1136.0	67.3	30.7	10.7	665.0	39.6	712.7	1119.1	3.0	8.11	3784.0	0.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
19	21/11/75	7.96	291.0	43.4	49.0	18.5	188.0	21.6	324.0	118.0	0.5	8.84	1054.0	1490.0
19	14/ 1/76	8.33	574.0	61.4	20.0	23.0	346.0	26.7	562.0	374.0	0.0	8.26	1987.1	3110.0
19	26/ 2/76	8.35	759.0	74.7	28.0	43.9	388.0	29.7	699.0	631.0	0.5	8.21	2653.8	3760.0
19	31/ 3/76	6.20	695.0	62.2	24.0	31.7	282.0	32.4	656.0	540.0	0.6	8.61	2323.9	3410.0
19	29/ 4/76	7.41	736.0	71.2	23.0	37.9	360.0	30.6	633.0	600.0	3.0	8.24	2494.7	3670.0
19	17/ 5/76	7.51	775.0	74.7	24.0	42.7	354.0	47.4	654.0	647.0	2.0	8.76	2620.8	3560.0
19	24/ 6/76	7.14	733.0	72.7	20.0	47.7	372.0	31.2	657.0	590.0	3.5	8.82	2527.1	3450.0
19	29/ 7/76	6.54	715.0	64.9	17.0	42.4	354.0	27.6	640.0	610.0	3.7	8.60	2474.6	3620.0
19	26/ 8/76	6.94	761.0	70.4	16.0	32.3	298.0	52.8	693.0	648.0	4.1	8.84	2575.6	3470.0
19	4/10/76	6.38	678.0	68.8	13.0	37.6	331.0	52.8	575.0	610.0	0.3	8.72	2366.5	3390.0
19	2/11/76	7.51	747.0	73.9	130.0	57.3	472.0	20.4	703.0	889.0	0.1	8.32	3092.7	4050.0
19	7/12/76	7.86	769.0	74.7	36.0	53.7	332.0	24.0	695.0	793.0	0.2	8.37	2777.6	3770.0
19	10/ 1/77	8.00	700.3	79.4	27.1	47.7	303.8	15.6	641.1	739.2	0.2	8.40	2554.3	3400.0
19	3/ 2/77	8.25	663.8	68.0	32.1	21.3	286.7	25.2	595.4	588.8	0.3	8.89	2281.6	3630.0
19	3/ 3/77	8.44	650.7	71.2	38.5	53.0	262.3	31.2	602.1	707.0	0.2	8.80	2416.1	3570.0
19	14/ 4/77	7.55	650.0	73.1	26.1	48.8	233.1	32.4	600.7	693.1	1.0	8.75	2358.1	3480.0
19	9/ 5/77	6.98	645.8	68.4	29.5	49.9	275.8	20.4	582.3	701.2	0.1	8.59	2373.4	3550.0
19	7/ 6/77	7.32	675.0	76.2	24.2	50.3	272.1	20.4	620.9	686.8	1.5	8.47	2427.6	3630.0
19	11/ 7/77	8.18	667.0	78.2	19.4	51.3	275.8	20.4	585.1	696.4	0.0	8.42	2393.7	3630.0
19	9/ 8/77	7.76	656.7	78.2	17.2	43.9	228.2	33.6	613.5	662.8	0.5	8.95	2334.5	3610.0
19	8/ 9/77	7.20	841.8	91.1	25.7	45.2	394.1	25.2	757.4	830.9	33.5	8.58	3045.0	4400.0
19	13/10/77	7.82	799.0	84.5	28.9	74.7	385.6	40.8	756.0	845.3	0.4	8.39	3015.1	4750.0
19	10/11/77	8.30	821.1	103.6	25.7	75.5	377.0	25.2	750.0	888.6	0.4	8.34	3067.1	4750.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/T	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
20	19/ 9/75	0.00	107.0	5.5	65.0	11.5	207.0	0.0	72.0	195.0	0.0	8.01	663.0	890.0
20	27/ 2/76	8.26	99.0	6.3	94.0	15.5	200.0	0.0	83.0	199.0	2.6	7.97	699.4	940.0
20	31/ 3/76	7.14	119.0	5.9	60.0	16.2	169.0	19.5	77.0	215.0	1.3	8.40	682.9	970.0
20	29/ 4/76	7.24	112.0	6.7	68.0	16.9	223.0	0.0	80.0	210.0	2.0	7.66	718.6	1000.0
20	17/ 5/76	7.44	104.0	6.7	65.0	15.4	162.0	6.6	81.0	231.0	2.8	8.63	674.5	980.0
20	25/ 6/76	7.04	109.0	5.5	82.0	14.6	215.0	6.0	77.0	213.0	1.5	8.57	723.6	940.0
20	30/ 7/76	7.28	106.0	5.1	80.0	15.4	212.0	0.0	78.0	198.0	2.0	8.33	696.5	970.0
20	27/ 8/76	7.24	115.0	6.3	65.0	15.3	195.0	7.2	84.0	192.0	1.0	8.47	680.6	930.0
20	5/10/76	7.48	109.0	5.5	104.0	15.3	207.0	0.0	75.0	263.0	1.2	8.26	780.0	980.0
20	2/11/76	8.61	122.0	6.3	139.0	17.3	194.0	20.4	82.0	351.0	1.5	8.36	933.5	1170.0
20	8/12/76	8.83	127.0	6.3	143.0	15.9	221.0	0.0	90.0	351.0	1.6	7.86	955.8	1210.0
20	11/ 1/77	8.99	122.1	6.6	136.1	15.7	216.0	0.0	77.7	364.1	1.5	7.93	939.8	1150.0
20	4/ 2/77	10.68	108.6	6.3	87.4	13.9	181.8	8.4	77.7	232.0	1.7	8.71	717.6	1060.0
20	3/ 3/77	9.53	111.1	6.6	84.6	14.6	189.1	9.6	81.9	240.6	1.3	8.56	739.5	1030.0
20	15/ 4/77	10.14	115.9	6.6	84.2	15.2	176.9	18.0	84.7	231.5	10.5	8.44	743.6	1050.0
20	10/ 5/77	7.32	117.3	6.6	84.2	14.7	135.4	18.0	84.4	236.3	1.2	8.45	698.1	1040.0
20	8/ 6/77	8.20	124.9	7.0	78.6	14.0	211.1	0.0	83.7	234.4	0.4	8.03	754.1	1040.0
20	12/ 7/77	8.47	114.3	6.5	79.6	14.1	183.0	14.4	75.9	230.5	0.3	8.22	718.8	1000.0
20	10/ 8/77	12.23	116.6	6.6	75.4	13.9	192.8	4.8	80.5	232.5	0.5	8.56	723.5	1030.0
20	9/ 9/77	7.80	110.4	5.9	93.0	16.9	197.7	12.0	80.8	261.3	0.4	8.42	778.4	1060.0
20	13/10/77	0.00	109.9	5.5	94.2	15.6	218.4	0.0	80.1	232.5	0.8	7.72	757.0	1090.0
20	10/11/77	9.03	127.7	6.3	93.4	16.7	224.5	0.0	87.2	258.4	0.6	7.71	814.8	1300.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
22	21/11/75	9.71	186.0	18.8	26.0	6.8	159.0	25.2	185.0	108.0	0.6	9.02	715.4	1130.0
22	14/ 1/76	10.12	396.0	17.2	27.0	27.3	409.0	0.0	226.0	371.0	0.0	7.75	1473.5	2010.0
22	27/ 2/76	9.64	333.0	14.9	30.0	23.4	243.0	20.7	229.0	395.0	0.7	8.37	1209.7	1850.0
22	31/ 3/76	9.23	203.0	16.4	23.0	48.0	238.0	27.6	250.0	517.0	0.3	8.61	1323.3	2090.0
22	29/ 4/76	8.52	472.0	21.1	51.0	84.6	408.0	0.0	304.0	724.0	0.2	7.71	2064.9	2750.0
22	17/ 5/76	8.10	427.0	23.5	42.0	48.0	204.0	21.9	272.0	693.0	0.8	8.41	1732.2	2440.0
22	25/ 6/76	8.22	405.0	20.8	41.0	42.9	256.0	9.6	246.0	584.0	0.6	8.62	1605.9	2210.0
22	30/ 7/76	7.81	428.0	21.5	36.0	42.5	278.0	0.0	250.0	648.0	0.8	8.45	1704.8	2490.0
22	26/ 8/76	7.87	448.0	23.9	34.0	35.3	245.0	33.6	286.0	590.0	1.5	8.74	1697.3	2460.0
22	5/10/76	8.16	462.0	21.1	14.0	30.8	243.0	18.0	263.0	629.0	0.9	8.63	1681.8	2260.0
22	2/11/76	9.35	422.0	18.4	155.0	40.1	333.0	0.0	288.0	754.0	0.3	8.37	2010.8	2620.0
22	8/12/76	9.79	452.0	18.8	130.0	37.3	450.0	0.0	270.0	696.0	3.1	7.46	2057.2	2500.0
22	11/ 1/77	10.03	438.6	19.2	121.2	35.6	452.7	0.0	743.6	716.6	0.9	7.66	2028.4	2310.0
22	4/ 2/77	10.44	400.2	17.2	105.2	33.7	362.4	0.0	221.6	620.5	0.4	8.39	1751.3	2420.0
22	3/ 3/77	10.94	458.6	19.5	185.4	48.5	441.7	0.0	267.4	842.0	0.4	8.17	2263.6	2860.0
22	15/ 4/77	10.74	451.7	18.8	94.0	44.7	237.9	25.2	267.7	763.2	13.5	8.32	1916.8	2620.0
22	10/ 5/77	10.00	453.6	17.6	119.8	44.5	328.2	18.0	260.3	806.9	0.4	8.37	2049.3	2720.0
22	7/ 6/77	9.92	439.3	20.3	122.6	44.0	385.6	0.0	266.3	758.9	0.1	8.00	2037.2	2720.0
22	11/ 7/77	10.39	427.8	19.2	114.2	47.2	268.4	24.0	277.7	802.1	0.1	8.26	1980.7	2740.0
22	9/ 8/77	9.68	416.3	18.8	87.4	43.8	295.3	6.0	248.9	715.6	0.0	8.52	1832.1	2500.0
22	13/10/77	10.29	394.5	17.2	27.3	33.9	176.9	0.0	231.2	629.2	0.3	7.83	1510.4	2150.0
22	10/11/77	10.69	390.3	18.4	38.3	37.7	225.7	0.0	221.6	648.4	0.4	7.97	1580.8	2000.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
23	21/11/75	7.83	205.0	41.9	47.0	20.8	270.0	0.0	211.0	191.0	12.5	8.23	999.2	1290.0
23	14/ 1/76	8.04	345.0	61.8	52.0	39.1	257.0	0.0	300.0	459.0	3.3	7.66	1517.2	2310.0
23	26/ 2/76	7.88	277.0	50.1	58.0	41.7	215.0	0.0	285.0	447.0	1.9	8.05	1375.7	2080.0
23	31/ 3/76	7.57	358.0	52.4	32.0	44.1	214.0	24.3	302.0	447.0	0.9	8.55	1374.7	2080.0
23	29/ 4/76	7.16	339.0	55.5	51.0	49.2	304.0	0.0	295.0	473.0	0.4	7.81	1567.1	2290.0
23	17/ 5/76	6.58	355.0	57.5	71.0	43.0	248.0	43.8	301.0	481.0	1.0	8.66	1601.3	2240.0
23	24/ 6/76	6.84	364.0	54.4	79.0	45.7	334.0	6.0	315.0	496.0	3.5	8.55	1697.6	2240.0
23	29/ 7/76	6.73	389.0	53.6	73.0	49.5	317.0	0.0	325.0	503.0	5.3	8.47	1715.4	2390.0
23	26/ 8/76	6.41	415.0	59.1	76.0	50.9	249.0	37.2	368.0	536.0	5.4	8.74	1796.6	2380.0
23	5/10/76	6.10	380.0	60.2	73.0	55.2	299.0	19.2	320.0	577.0	0.4	8.72	1784.0	2450.0
23	2/11/76	6.73	406.0	66.1	124.0	56.5	277.0	30.0	356.0	761.0	0.1	8.28	2076.7	2700.0
23	7/12/76	7.11	436.0	66.5	113.0	53.6	295.0	0.0	349.0	705.0	1.3	7.97	2019.4	2630.0
23	10/ 1/77	7.39	361.3	69.6	101.8	53.3	311.2	0.0	346.8	604.2	0.4	8.22	1848.6	2520.0
23	3/ 2/77	7.51	384.8	60.2	96.6	49.9	245.3	30.0	344.0	627.8	0.3	8.80	1838.7	2780.0
23	3/ 3/77	7.65	384.3	61.4	108.4	59.1	229.4	31.2	347.9	698.8	0.4	8.73	1920.9	2750.0
23	14/ 4/77	6.84	381.6	57.9	104.6	61.7	228.2	39.6	361.0	657.5	0.6	8.68	1892.6	2810.0
23	9/ 5/77	7.28	397.2	54.7	90.0	54.8	240.4	16.8	365.2	660.9	3.4	8.43	1883.5	2780.0
23	7/ 6/77	7.56	417.2	60.6	97.8	62.1	344.1	0.0	368.4	643.6	0.4	8.02	1994.2	2860.0
23	11/ 7/77	7.32	382.7	54.3	88.2	54.6	290.4	19.2	341.1	619.6	0.2	8.26	1850.3	2690.0
23	9/ 8/77	7.55	391.9	58.7	83.8	52.0	306.3	9.6	328.4	587.9	0.1	8.65	1818.6	2600.0
23	8/ 9/77	7.85	399.3	55.1	87.4	56.2	280.6	18.0	348.2	586.0	1.3	8.47	1832.1	2610.0
23	13/10/77	8.42	372.6	52.0	74.1	49.6	267.2	0.0	336.9	595.6	0.5	7.62	1748.5	2670.0
23	10/11/77	8.73	345.5	48.9	73.1	46.6	273.3	0.0	292.2	518.7	0.4	7.79	1598.7	2750.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/I	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
24	11/ 1/77	9.99	721.3	12.5	73.9	15.2	331.9	0.0	361.7	951.0	2.3	7.65	2469.8	3270.0
24	4/ 2/77	10.06	741.8	9.8	52.5	8.8	352.6	9.6	368.8	967.3	0.0	8.67	2511.2	3270.0
24	4/ 3/77	10.01	684.5	9.0	64.3	12.5	312.4	240.0	349.6	925.5	0.4	8.62	2598.3	3350.0
24	15/ 4/77	9.29	777.6	9.4	55.5	11.8	284.3	30.0	397.2	1020.6	19.0	8.66	2605.4	3610.0
24	10/ 5/77	9.92	827.5	15.6	78.2	14.3	370.9	21.6	437.2	1162.3	0.3	8.47	2928.1	4040.0
24	7/ 6/77	9.73	841.8	9.0	85.0	14.3	394.1	0.0	452.5	1119.1	0.2	8.03	2916.0	3970.0
24	11/ 7/77	10.39	886.7	10.2	74.9	14.3	331.9	12.0	502.5	1239.2	0.2	8.23	3071.9	4300.0
24	9/ 8/77	10.04	806.2	9.4	30.1	8.6	285.5	14.4	431.9	965.4	0.0	8.71	2551.5	3650.0
24	8/ 9/77	9.74	599.2	7.8	26.1	12.3	286.7	24.0	318.4	734.9	0.1	8.71	2009.4	2940.0
24	13/10/77	10.43	640.1	7.4	12.2	4.6	330.7	20.4	279.8	773.3	0.2	8.86	2068.7	3030.0
24	10/11/77	10.54	732.5	9.0	13.4	6.7	369.7	19.2	395.7	787.7	0.3	8.40	2334.3	3500.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/I	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
25	21/11/75	10.58	785.0	20.7	67.0	14.9	620.0	0.0	419.0	817.0	0.0	7.98	2743.6	3580.0
25	14/ 1/76	11.33	769.0	11.7	67.0	31.3	569.0	0.0	374.0	830.0	0.5	6.91	2652.5	3630.0
25	27/ 2/76	11.02	626.0	11.7	45.0	25.8	352.0	0.0	380.0	793.0	0.8	7.04	2234.3	3220.0
25	31/ 3/76	10.82	711.0	11.0	44.0	27.1	405.0	51.9	377.0	786.0	1.0	8.60	2414.0	3210.0
25	29/ 4/76	10.55	692.0	12.9	44.0	31.5	471.0	0.0	388.0	808.0	0.4	7.43	2447.9	3310.0
25	17/ 5/76	10.09	675.0	15.3	32.0	24.7	398.0	47.4	325.0	775.0	0.5	8.58	2292.9	3260.0
25	24/ 6/76	10.01	697.0	13.7	54.0	24.0	460.0	14.4	337.0	859.0	0.2	8.72	2459.3	3160.0
25	29/ 7/76	9.91	761.0	13.7	36.0	24.1	566.0	0.0	327.0	805.0	1.5	8.44	2534.4	3400.0
25	26/ 8/76	9.61	815.0	14.5	16.0	24.3	397.0	50.4	353.0	959.0	0.4	8.86	2629.6	3190.0
25	5/10/76	9.86	728.0	14.1	32.0	23.0	426.0	36.0	347.0	868.0	1.3	8.78	2475.4	3230.0
25	2/11/76	10.19	792.0	15.3	54.0	28.9	421.0	49.2	392.0	1110.0	0.5	8.57	2862.9	3550.0
25	8/12/76	10.41	864.0	14.9	24.0	27.2	371.0	9.6	468.0	1038.0	3.1	8.00	2819.8	3690.0
25	11/ 1/77	10.68	889.2	16.0	26.5	22.7	390.5	0.0	505.7	1026.9	2.8	8.17	2880.2	3630.0
25	3/ 2/77	11.14	853.3	13.3	17.2	23.0	346.5	34.8	452.1	978.4	3.1	9.02	2721.7	3950.0
25	4/ 3/77	13.22	806.8	12.5	19.4	18.1	289.2	28.8	455.3	927.5	0.5	8.82	2558.2	3710.0
25	15/ 4/77	12.25	837.0	12.5	10.4	9.6	267.2	58.8	489.3	955.3	8.0	8.87	2648.2	3770.0
25	10/ 5/77	12.52	820.2	15.2	14.2	15.3	272.1	19.2	439.0	970.2	0.4	8.65	2565.9	3630.0
25	7/ 6/77	13.31	749.8	14.9	27.7	19.9	328.2	0.0	373.0	936.6	0.3	8.19	2450.4	3570.0
25	11/ 7/77	13.45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0
25	9/ 8/77	13.77	736.0	13.7	30.5	15.6	295.3	13.2	406.0	955.8	0.4	8.79	2466.4	3610.0
25	8/ 9/77	12.74	776.5	14.1	44.9	20.6	207.4	18.0	525.5	941.4	0.2	8.52	2548.5	3780.0
25	13/10/77	12.76	837.2	13.7	25.0	15.7	183.0	18.0	536.9	979.8	0.3	8.54	2609.6	3950.0
25	10/11/77	12.75	787.8	14.5	17.2	18.0	201.3	15.6	494.0	946.2	0.6	8.74	2495.2	4000.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
26	14/ 1/76	6.90	325.0	11.7	35.0	6.8	275.0	0.0	312.0	210.0	0.5	8.26	1176.0	1940.0
26	27/ 2/76	6.32	451.0	12.9	34.0	25.8	111.0	0.0	585.0	898.0	0.1	8.24	2117.8	3700.0
26	31/ 3/76	6.05	798.0	10.6	30.0	46.7	163.0	0.0	641.0	1123.0	0.0	8.35	2812.3	4150.0
26	29/ 4/76	5.92	866.0	12.1	26.0	47.2	242.0	0.0	593.0	1126.0	0.1	8.32	2912.4	4440.0
26	17/ 5/76	6.04	989.0	14.1	37.0	51.7	292.0	24.3	582.0	1246.0	0.2	8.82	3236.3	4370.0
26	24/ 6/76	5.52	934.0	12.9	35.0	52.9	337.0	7.2	578.0	1180.0	0.1	8.64	3137.1	4310.0
26	29/ 7/76	5.42	999.0	9.0	43.0	54.0	211.0	0.0	573.0	1302.0	3.7	8.51	3194.7	4540.0
26	26/ 8/76	5.49	1021.0	17.2	65.0	57.9	369.0	54.0	639.0	1340.0	0.8	8.88	3563.9	4430.0
26	5/10/76	5.75	1023.0	13.7	77.0	58.4	351.0	32.4	597.0	1366.0	1.5	8.67	3520.0	4470.0
26	2/11/76	6.31	1049.0	16.4	118.0	56.2	392.0	22.8	627.0	1470.0	0.4	8.59	3751.8	4640.0
26	7/12/76	6.59	1033.0	15.3	91.0	50.1	384.0	10.8	588.0	1383.0	2.0	8.36	3557.2	4520.0
26	11/ 1/77	6.75	1032.5	15.6	63.1	39.6	372.2	18.0	583.0	1373.2	1.7	8.34	3498.9	4310.0
26	3/ 2/77	6.85	952.9	13.3	69.7	43.4	327.0	42.0	561.0	1330.4	1.5	9.00	3341.3	4730.0
26	4/ 3/77	7.20	929.7	14.9	77.6	49.9	350.2	36.0	559.2	1358.3	1.8	8.73	3377.4	4720.0
26	14/ 4/77	8.10	912.4	13.7	72.3	52.8	340.4	68.4	561.7	1255.0	2.8	8.82	3279.5	4620.0
26	9/ 5/77	7.23	976.3	14.5	72.7	52.3	375.8	37.2	556.4	1397.7	2.3	8.57	3485.3	4740.0
26	7/ 6/77	7.72	989.0	14.9	69.9	54.6	423.4	20.4	614.9	1392.9	0.4	8.32	3580.4	4870.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/L	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
27	21/11/75	8.29	97.0	12.5	47.0	19.1	196.0	0.0	63.0	148.0	0.4	8.26	583.0	740.0
27	14/ 1/76	8.42	95.0	9.0	52.0	18.0	254.0	0.0	62.0	150.0	0.0	7.88	640.0	910.0
27	27/ 2/76	8.22	90.0	8.2	60.0	20.1	205.0	0.0	66.0	145.0	0.2	7.91	594.5	810.0
27	31/ 3/76	6.74	100.0	7.8	32.0	20.2	217.0	0.0	57.0	155.0	0.4	8.52	589.4	770.0
27	29/ 4/76	6.38	95.0	7.8	30.0	17.5	157.0	0.0	64.0	133.0	0.1	7.92	504.4	700.0
27	17/ 5/76	6.29	116.0	8.2	42.0	19.8	171.0	0.0	94.0	175.0	0.3	8.47	626.3	910.0
27	24/ 6/76	6.72	87.0	6.3	55.0	17.9	198.0	6.0	55.0	142.0	1.1	8.54	568.3	720.0
27	29/ 7/76	5.99	88.0	6.3	59.0	19.1	211.0	0.0	52.0	152.0	0.4	8.31	587.8	790.0
27	26/ 8/76	5.79	96.0	7.0	57.0	19.1	176.0	21.6	60.0	167.0	1.1	8.56	604.8	750.0
27	5/10/76	6.28	92.0	6.6	19.0	14.3	128.0	6.0	62.0	126.0	0.2	8.34	454.1	610.0
27	2/11/76	7.75	101.0	7.0	47.0	18.8	193.0	14.4	65.0	155.0	0.0	8.35	601.2	740.0
27	7/12/76	8.34	112.0	7.0	26.0	19.2	166.0	0.0	76.0	132.0	4.3	8.06	542.5	730.0
27	11/ 1/77	8.62	99.1	8.2	46.3	21.3	202.6	0.0	81.6	160.4	0.3	8.14	619.7	800.0
27	3/ 2/77	8.85	115.0	7.4	43.3	21.4	190.4	7.2	78.7	151.3	0.4	8.78	615.1	900.0
27	4/ 3/77	9.08	111.6	8.2	58.7	23.8	31.7	64.2	352.8	162.3	0.3	8.69	813.7	960.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

(Continued)

TABLE A-13. (CONTINUED)

SITE	DATE	DEPTH FEET	NA MG/L	K MG/I	CA MG/L	MG MG/L	HCO3 MG/L	CO3 MG/L	CL MG/L	SO4 MG/L	NO3 MG/L	PH	TDS MG/L	E.C. E-6
29	21/11/75	5.10	337.0	37.5	88.0	28.4	88.0	0.0	644.0	187.0	0.6	7.71	1410.5	2320.0
29	14/ 1/76	5.42	1914.0	54.0	450.0	111.8	126.0	0.0	2561.0	1889.0	7.0	7.63	7112.8	10680.0
29	26/ 2/76	5.09	3119.0	49.7	516.0	152.4	204.0	0.0	4136.0	2875.0	35.8	7.33	11087.9	15290.0
29	31/ 3/76	4.38	4156.0	32.1	432.0	181.7	322.0	0.0	4320.0	3037.0	8.6	7.84	12489.4	14740.0
29	29/ 4/76	4.54	3583.0	27.8	460.0	158.0	519.0	0.0	4043.0	3037.0	5.9	7.56	11833.7	15730.0
29	17/ 5/76	3.94	3649.0	29.7	435.0	153.9	203.0	0.0	4091.0	3425.0	1.4	8.14	11988.0	15290.0
29	24/ 6/76	4.39	3282.0	25.8	538.0	155.7	543.0	0.0	4072.0	3036.0	6.1	7.81	11658.6	15100.0
29	29/ 7/76	3.95	3782.0	25.4	486.0	155.8	467.0	0.0	3942.0	3516.0	9.1	7.82	12383.4	16310.0
29	26/ 8/76	4.36	3841.0	28.9	411.0	152.1	244.0	0.0	4337.0	3660.0	9.8	8.10	12683.8	14990.0
29	15/10/76	4.64	3102.0	26.2	517.0	146.6	232.0	0.0	3734.0	3132.0	0.6	8.06	10890.4	15430.0
29	2/11/76	6.61	3576.0	30.1	472.0	133.8	299.0	15.6	3710.0	3583.0	0.3	8.39	11819.8	14430.0
29	7/12/76	6.55	3617.0	27.4	474.0	145.9	343.0	14.4	3760.0	3526.0	0.5	7.94	11908.2	14760.0
29	10/ 1/77	6.59	3611.9	30.9	449.1	141.1	396.6	0.0	3703.1	3522.5	3.8	7.89	11858.9	13990.0
29	3/ 2/77	6.56	3175.6	26.2	458.9	126.8	389.2	14.4	3527.2	3157.5	9.7	8.46	10885.6	15320.0
29	4/ 3/77	6.93	3078.1	25.0	445.9	124.2	379.5	51.6	3445.3	3353.0	4.5	8.59	10907.0	14950.0
29	14/ 4/77	8.12	3113.3	24.6	476.4	133.0	391.7	42.0	3532.5	3437.5	4.9	8.59	11155.9	14860.0
29	9/ 5/77	6.53	3128.5	23.5	466.9	222.4	545.4	0.0	3379.3	3515.8	5.4	8.25	11287.2	15800.0
29	7/ 6/77	6.76	3274.1	25.8	481.4	130.1	597.9	0.0	3596.7	3419.7	0.8	7.71	11526.4	15580.0
29	11/ 7/77	6.79	3314.3	21.5	400.8	114.1	512.5	28.8	3304.5	3429.3	0.5	7.94	11126.3	14900.0
29	9/ 8/77	7.37	2930.2	21.5	420.8	115.2	566.2	8.4	3173.7	3246.8	0.4	8.39	10483.1	14760.0
29	13/10/77	7.37	3041.8	24.6	341.5	117.1	591.8	0.0	3214.1	3141.2	0.4	7.43	10472.5	15110.0
29	10/11/77	7.65	2941.7	25.8	341.9	104.6	573.5	0.0	3098.1	3122.0	1.0	7.68	10208.5	14750.0

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO; NMSU, LAS CRUCES.

TABLE A14.

DEPTH-TO-WATER FOR SELECTED WELLS, MESILLA VALLEY
CHEMISTRY UNAVAILABLE. INFORMATION SOURCE: NMIMT, SOCORRO

SITE	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	1975	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.75	0.00
4	1976	15.50	16.00	15.74	15.65	15.64	15.50	14.39	14.02	0.00	13.20	13.85	14.43
4	1977	14.85	15.10	15.69	15.73	0.00	15.65	16.20	16.60	16.33	16.37	16.74	0.00
21	1975	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	1976	9.58	9.48	8.89	8.59	8.35	8.58	8.26	8.16	0.00	8.71	9.00	9.34
21	1977	9.50	9.56	9.44	8.83	8.67	8.82	8.47	8.33	8.54	9.35	9.49	0.00
28	1975	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.81	0.00
28	1976	8.79	8.60	8.38	8.10	7.58	7.95	7.95	7.77	0.00	8.12	0.00	8.67
28	1977	8.73	8.80	8.83	8.23	8.67	8.60	0.00	0.00	0.00	0.00	0.00	0.00

A ZERO VALUE INDICATES THE INFORMATION IS NOT AVAILABLE.
INFORMATION SOURCE: NMIMT, SOCORRO

APPENDIX B

B. FORTRAN LISTING OF USBR-EPA HYDROSALINITY MODEL FOR THE MESILLA VALLEY

Model Revision

The revision of the model from its original form to the present Fortran version consisted of the following changes:

a. The subroutines PWROPR, RESOPR, and DTABLE, describing the operation of a surface reservoir and power plant, were deleted, for they are not needed in either the Vernal case study or Mesilla Valley study. Necessary changes, as a result of the deletion of these subroutines, were made in the subroutine PERUSE.

b. Originally, the computer program for the model was written for a Control Data Corporation computing system. To make the program compatible with an IBM 360-44 system, three types of changes were made:

1. Definition of variables and arrays -- Several variables and arrays were defined by alphanumeric fields (A-FORMAT) having work lengths of more than four bytes (e.g., A6, A8, etc). Because of the smaller word length available on the IBM 360-44 (four bytes or less), a provision was made to accommodate such variables and arrays. Some data arrays were part alphanumeric and part real variable. These data arrays were changed so that they could be accommodated on an IBM 360-44.

2. Format statements -- The original program used an R-FORMAT to define a number of variables. These variables were redefined by nonexecutable statements (e.g., integer or real statements). The A-FORMAT statements involving Ai, $i > 4$ (e.g., A6, A8, etc.) were changed.

3. Dimension statements -- The dimension of the arrays containing 20 nodes were changed to 5 nodes, since we do not propose to use more than 5 nodes in this study. This reduced the computer storage space and made the program more efficient.

c. The form of the data input was modified to allow the irrigation requirement to be met by both surface and groundwater when surface water is not sufficient.

These changes do not alter the basic structure of the model; all changes are indicated in the source listing following.

Before proceeding with simulations for the Mesilla Valley, the model was tested to see if it would reproduce the previous results for the Vernal, Utah, case study. After the program was modified to permit internodal transfer from the upstream aquifer to the downstream aquifer, the model produced results which were identical to those given by the U. S. Bureau of Reclamation (1977b).

Program Source Listing

The following code is used in the USBR-EPA model source listing to indicate changes made by us.

A: cards changed
B: cards added
CN: cards deleted, N = number of cards

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```
      PROGRAM ACUMEN
      DIMENSION CX(122),CY(122),TX(122)
      DIMENSION DESCS(2,13),SIFAS(13)
C**** THIS COMPUTER APPLICATION HAS BEEN DESIGNED AS A SYSTEM ANALYSIS  HYD00010
C**** AND CONJUNCTIVE USE MODEL EMULATING A NODAL CONCEPT IN DIVIDING   HYD00020
C**** A WATER BASIN INTO PERTINENT FUNCTIONAL OR RESPONSIVE CRITICAL    HYD00030
C**** AREAS ALLOWING AS MUCH FLEXIBILITY IN MODEL DESIGN AS WAS         HYD00040
C**** CONSIDERED PRACTICAL                                              HYD00050
       COMMON / GENRL / TITLE(16),NCPRL( 5, 3), MOREG, IYRREG, MOEND, IHYD00060
     1YREND, NUMNOD, ISEQ( 5, 20), KOPT, NUMSEQ( 5), NOWTR( 5, 20)      HYD00070
      COMMON / RESCO /
     1 DIVSEQ(5,13,12),DEMAND(5,13,16),W                                         A
     2DEMNME( 5, 10,16), KOTNME( 5, 10,16) , KAQUNM (5,16)              HYD00100
       COMMON / PROPER / SOIL( 5, 10, 21), BTANK( 5, 10), TTANK( 5, 10),HYD00130
     1 GRTANK( 5, 10) , NSEQ ( 5) , CONUSE ( 5, 10, 30)                 HYD00140
      DIMENSION KUSE(5,10,30)
       COMMON / SALT / QTO ( 5, 23), WQAL( 5, 23)                       HYD00160
      COMMON / PARAM / REGRES (  5, 11 ) , BEGWR (  5, 10 ) ,           HYD00170
     1        PREDIC (  5, 10 ) , OBSVAL ( 5,10), CHEMOM (  5, 10, 10)  HYD00180
      DIMENSION QINRIV(10), OBSERV(13), KFA(23),                        HYD00190  A
     1          DFLOW (10 ) , TEMP (10)                                 HYD00200
      EQUIVALENCE ( CONUSE, KUSE )                                      HYD00210
C**** THIS IS THE FIRST TIME PROGRAM HAS BEEN ENTERED FOR A PARTICULAR  HYD00240
C**** JOB - SET READ AND WRITE UNITS AND READ SYSTEM STRUCTURE AND      HYD00250
C**** PERTINENT INITIALIZATION PARAMETERS                               HYD00260
      KCOUNT=0                                                                   B
      IR=5                                                              HYD00270
      IW=6                                                              HYD00280
      LINE = 0                                                          HYD00290
      DO 5 K = 1, 3                                                     HYD00300
      JREAD = K                                                         HYD00310
      CALL PERUSE(JREAD,IW,IR,FLPASD)                                            A
    5 CONTINUE                                                          HYD00330  C1
      MO = MOREG                                                        HYD00350
      IYR = IYRREG                                                      HYD00360
C**** INITIALIZE PASS INDEX OF EACH NODE FOR USE IN ITERATIVE SCHEME    HYD00370
C**** INITIALIZE STARTING INDICES FOR NODE (MIN) AND SEQUENCE ( MINA )  HYD00410  C3
C**** LOOPS                                                             HYD00420  C2
   13 WRITE(IW,16)                                                      HYD00450  A
   16 FORMAT ( 1H1, 9X )                                                HYD00460
C**** BEGIN ITERATIVE SCHEME FOR EACH NODE WHERE NUMNOD = NUMBER OF NODEHYD00470
   20 DO 600 KN=1,NUMNOD                                                HYD00480
C**** CHECK TO DETERMINE IF THIS IS THE FIRST PASS THROUGH THIS NODE    HYD00490  C1
C**** THIS IS THE FIRST PASS THROUGH THIS NODE ** INITIALIZE RIVER      HYD00510
C**** FLOW AND CHEMISTRY ARRAY ( QINRIV ) AND UPDATE AQUIFER ASSUME ONE HYD00520
C**** MONTH LAG IN CHEMISTRY MIX ** LET ARRAY BEGWR = BEGINNING         HYD00530
C**** CONDITIONS OF AQUIFER AT START OF TIME FRAME                      HYD00540
      DO 25 K = 1, 10                                                   HYD00550
      QINRIV (K) = 0.0                                                  HYD00560
      BTANK ( KN, K ) = 0.0                                             HYD00570
      TTANK ( KN, K ) = 0.0                                             HYD00580
      BEGWR (KN, K ) = GRTANK ( KN, K )                                 HYD00590
   25 CONTINUE                                                          HYD00600
C**** THIS PORTION OF THE SUBROUTINE IS USED FOR ALL PASSES ** LET NS=  HYD00610
C**** NUMBER OF SEQUENTIAL OPERATIONS IN THIS NODE                      HYD00620
   30 NS = NUMSEQ ( KN)                                                 HYD00630

C**** LOOP THROUGH EACH SEQUENCE IN NODE                                HYD00640
      FLEAK=0.45                                                                 B
    * DO 500 KS=1,NS                                                    HYD00650
      IS = IABS ( ISEQ (KN, KS ) )                                      HYD00660
      IF ( ISEQ (KN, KS)) 50, 500, 400                                  HYD00670
   50 IF(IS-2)51,52,55                                                           B
   51 IF(DEMAND(KN,IS,MO) .NE. 0.0)GO TO 54                                      B
      DEMAND(KN,IS,MO)=QINRIV(1)                                                 B
      GO TO 55                                                                   B
   54 DEMAND(KN,IS,MO)=QINRIV(1)-DEMAND(KN,IS,MO)                                B
   56 IF(DEMAND(KN,IS,MO) .GT. QINRIV(1))DEMAND(KN,IS,MO)=QINRIV(1)              B
      GO TO 55                                                                   B
   52 RLEAK(1)=FLEAK*QINRIV(1)                                                   B
      QINRIV(1)=QINRIV(1)-RLEAK(1)                                               B
      DO 57 II=2,10                                                              B
   57 RLEAK(II)=QINRIV(II)                                                       B
      CALL CHEMBT(RLEAK,0.0,KN,IS)                                               B
      DEMAND(KN,IS,MO)=DEMAND(KN,3,MO)-QINRIV(1)                                 B
      IF(DEMAND(KN,IS,MO))53,55,55                                               B
   53 IF(ABS(DEMAND(KN,IS,MO)).LE.1.0)DEMAND(KN,3,MO)=QINRIV(1)                  B
      DEMAND(KN,IS,MO)=0.0                                                       B
   55 CONST=DEMAND(KN,IS,MO)                                                     A
      TEST = DEMAND ( KN, IS, 14)                                       HYD00690
      IF ( TEST .GT. 2.0. AND. TEST . LT. 6.0 ) GO TO 250               HYD00700
C**** THIS OPERATIONAL SEQUENCE REPRESENTS A DEMAND IN THE NODE         HYD00710
C**** WHOSE SOURCE MAY BE FROM THE RIVER ( SURFACE FLOW ) OR FROM THE   HYD00720
C**** AQUIFER ( SUBSURFACE FLOW ) TO SUPPLY EITHER AN IRRIGATION        HYD00730
C**** OR A MUNICIPAL AND INDUSTRIAL REQUIREMENT                         HYD00740
      IF ( DEMAND (KN, IS, 13 ) .GT. 1.0 )  GO TO 170                   HYD00750
C**** DEMAND IS TO BE SUPPLIED FROM RIVER ( SURFACE FLOW)               HYD00760
      IF ( TEST . EQ. 6.0 ) GO TO 230                                   HYD00770
      TEMPR = QINRIV (1) - CONST                                        HYD00780
      IF ( ABS (TEMPR).LT. 1.0 )  TEMPR = 0.0                           HYD00790
      IF ( TEMPR . LT. 0.0 ) GO TO 100                                  HYD00800
C**** DEMAND CAN BE FULLY MET BY FLOW IN THE RIVER SET INDEX (INDY) = 1 HYD00810
      INDY = 1                                                          HYD00820
C**** CALL RETURN FLOW AND SHORTAGE SUBROUTINE ( RECOMP ) TO COMPUTE    HYD00830
C**** AND ALLOCATE RETURN FLOW MAGNITUDE AND CHEMISTRY AND COMPARE      HYD00840
C**** SHORTAGE ( IF ANY ) WITH SHORTAGE INDEX ** IF THE TEST FAILS THE  HYD00850
C**** SHORTAGE CRITERIA RECOMP WILL TERMINATE COMPUTATION               HYD00860
   60 CALL RECOMP ( QINRIV, KN, IS, INDY, MO, CONST, IW )               HYD00870
C**** SET ACTUAL DIVERSION AND CHEMISTRY OF WATERS DIVERTED             HYD00880
   70 DEMAND ( KN, IS, 16 ) = CONST                                     HYD00890
      QINRIV (1) = TEMPR                                                HYD00900
      DO 80 K = 2, 10                                                   HYD00910
      CHEMOM ( KN, IS , K ) = QINRIV (K)                                HYD00920
   80 CONTINUE                                                          HYD00930
      GO TO 500                                                         HYD00940
C**** THERE ARE NO UPSTREAM RESERVOIRS AVAILABLE FOR ADDITIONAL RELEASESHYD01010
C**** SET DIVERSION EQUAL TO FLOW IN RIVER AND CALL ROUTINE RECOMP      HYD01020
C**** TO DETERMINE IF SHORTAGE IS TOLERABLE AND COMPUTE RETURN FLOW     HYD01030
C**** AND ALLOCATION. IF SHORTAGE IS NOT TOLERABLE ROUTINE RECOMP WILL  HYD01040
C**** TERMINATE COMPUTATION                                             HYD01050
  100 INDY = 2                                                          HYD01060
      CONST = QINRIV (1)                                                HYD01070
      TEMPR = 0.0                                                       HYD01080
      GO TO 60
C**** SEARCH FOR AVAILABLE UPSTREAM RESERVOIRS FOR POSSIBLE ADDITIONAL  HYD01090
C**** RELEASES TO MEET THIS DEFICIT                                     HYD01100
  110 CONTINUE                                                          HYD01110
      GO TO 100
C**** DEMAND IS TO BE SUPPLIED FROM AQUIFER ( SUBSURFACE FLOW )         HYD01540
  170 TEMPR = GRTANK ( KN, 1 ) - CONST                                  HYD01550
      IF ( TEST .EQ. 6.0 )  GO TO 340                                   HYD01560
      IF ( ABS ( TEMPR ) .LT. 1.0 ) TEMPR = 0.0                         HYD01570
      IF ( TEMPR . LT. 0.0 ) GO TO 220                                  HYD01580
C**** DEMAND CAN BE FULLY SUPPLIED FROM AQUIFER ( SUBSURFACE FLOW )     HYD01590
C**** SET INDEX (INDY) = 1                                              HYD01600
      INDY = 1                                                          HYD01610
C**** CALL RETURN FLOW AND SHORTAGE SUBROUTINE ( RECOMP ) TO COMPUTE    HYD01620
C**** AND ALLOCATE RETURN FLOW MAGNITUDE AND CHEMISTRY AND COMPARE      HYD01630
C**** SHORTAGE ( IF ANY ) WITH SHORTAGE INDEX ** IF THE TEST FAILS THE  HYD01640
C**** SHORTAGE CRITERIA RECOMP WILL TERMINATE COMPUTATION               HYD01650
  180 DO 195 K = 2, 10                                                  HYD01660
      TEMP (K) = BEGWR ( KN, K )                                        HYD01670
  195 CONTINUE                                                          HYD01680
      CALL RECOMP ( TEMP  , KN, IS, INDY, MO, CONST, IW )               HYD01690
      GRTANK ( KN, 1 ) = TEMPR                                          HYD01700
C**** SET ACTUAL DIVERSION AND CHEMISTRY OF WATERS DIVERTED             HYD01710
  190 DEMAND ( KN , IS, 16 ) = CONST                                    HYD01720
      DO 200 K = 2, 10                                                  HYD01730
      CHEMDM ( KN, IS, K ) = BEGWR ( KN, K )                            HYD01740
  200 CONTINUE                                                          HYD01750
      GO TO 500                                                         HYD01760
C**** DEMAND CAN NOT BE FULLY SUPPLIED BY AQUIFER- COMPUTE SHORTAGE     HYD01770
C**** RETURN FLOW AND ALLOCATION ( IF SHORTAGE NOT TOLERABLE RECOMP     HYD01780
C**** WILL TERMINATE COMPUTATION )                                      HYD01790
  220 CONST = GRTANK ( KN, 1 )                                          HYD01800
      INDY = 2                                                          HYD01810
      TEMPR = 0.0                                                       HYD01820
      GO TO 190                                                         HYD01830
C**** THIS DEMAND REPRESENTS A SURFACE FLOW THAT IS TRANSFERRED OUT     HYD01840
C**** OF SYSTEM                                                         HYD01850
  230 TEMPR = QINRIV (1) - CONST                                        HYD01860
      IF ( TEMPR . LT. 0.0 )   GO TO 1010                               HYD01870
      GO TO 70                                                          HYD01880
C**** WHEN DEMAND ( KN, IS, 14) THE DESTINATION OR USE INDEX IS GREATER HYD01890
C**** THAN 2.0 SIMPLE TRANSFERS OF FLOW ARE TREATED AS DEMANDS SO THAT  HYD01900
C**** ROUTINE RECOMP WILL SET UP THE PROPER QINFLO ARRAY. THESE TRANSFERHYD01910
C**** CAN HAVE PERCOMPUTED VOLUMES (INPUT DATA ) OR WILL BE COMPUTED IN HYD01920
C**** SIMULATION                                                        HYD01930
  250 IF ( DEMAND ( KN, IS, 13 ) .GT. 1.0 ) GO TO 290                   HYD01940
C**** TRANSFERS WILL BE MADE FROM THE RIVER (SURFACE FLOW) TO AQUIFER   HYD01950
C**** OR SOIL COLUMN                                                    HYD01960
      IF ( TEST.EQ. 3 )    INDY = 3                                     HYD01970
      IF ( TEST.EQ. 4 )    INDY = 4                                     HYD01980
      TEMPR = QINRIV (1) - CONST                                        HYD01990
      IF ( ABS (TEMPR) .LT. 1.0 )  TEMPR = 0.0                          HYD02000
      IF ( TEMPR . LT. 0.0 )   GO TO 1060                               HYD02010
      GO TO 60                                                          HYD02020
C**** TRANSFERS WILL BE MADE FROM THE AQUIFER (SUBSURFACE FLOW ) TO THE HYD02030
C**** RIVER ** CONDITIONALLY IF THE AQUIFER IN ANY NODE CANNOT MEET THE HYD02040
                                                                        HYD02050
C**** TRANSFER REQUIREMENT.  AN INTERNODAL TRANSFER TO THE RIVER WILL
C**** BE ALLOWED ONLY FROM THE NODE IMMEDIATELY UPSTREAM OF THE NODE    HYD02060
C**** IN DEFICIT                                                        HYD02070
  290 TEMPR =  GRTANK ( KN, 1 ) - CONST                                 HYD02080
      IF ( ABS ( TEMPR ) . LT. 1.0 )  TEMPR = 0.0                       HYD02090
      IF ( KN. GT. 1 )  GO TO 295                                       HYD02100
      IF ( TEMPR . LT. 0.0 )  GO TO 1070                                HYD02110
      GO TO 180                                                         HYD02120
C**** SET QINFLO ARRAY ** LET NODE = KUSE ( KN, IS, 24) AND SEQUENCE =  HYD02130
C**** KUSE ( KN, IS , 25 ) .  ALSO SET UPSTREAM AQUIFER NODE = KUSE     HYD02140
C**** ( KN, IS, 28 ) FOR INTERNODAL TRANSFER ( IF REQUIRED )            HYD02150
  295 LN = KUSE ( KN, IS, 28 )                                          HYD02160
      IF ( LN . EQ. 0 )  GO TO 1070                                     HYD02170
      KG = NEIND ( LN )                                                 HYD02180
      LN = KUSE ( KN, IS, 24 )                                          HYD02190
      IF ( LN . EQ. 0 )  GO TO 1070                                     HYD02200
      KP = NEIND ( LN )                                                 HYD02210
      KZ = KUSE ( KN, IS , 25 )                                         HYD02220
      IF ( TEMPR . LT. 0.0 )  GO TO 310                                 HYD02230
C**** NO INTERNODAL TRANSFER REQUIRED                                   HYD02240
      DO 300 K = 1, 10                                                  HYD02250
      QINFLO ( KP, KZ, K ) = 0.0                                        HYD02260
  300 CONTINUE                                                          HYD02270
      GO TO 180                                                         HYD02280
C**** AN INTERNODAL TRANSFER IS REQUIRED CHECK CONDITIONS OF AQUIFER IN HYD02290
C**** UPSTREAM NODE                                                     HYD02300
  310 COMP = ABS ( TEMPR )                                              HYD02310
      COMPA = GRTANK ( KG, 1 ) - COMP                                   HYD02320
      IF ( COMPA . LT. 0.0 )  GO TO 500                                 HYD02330
C**** UPSTREAM AQUIFER CAN MEET DEFICIT SET QINFLO AND GRTANK ARRAYS    HYD02340   A
      GRTANK ( KG, 1 ) = COMPA                                          HYD02350
      DO 320 K = 2, 10                                                  HYD02360
      QINFLO ( KP, KZ, K ) = GRTANK ( KG , K )                          HYD02370
  320 CONTINUE                                                          HYD02380
      QINFLO ( KP, KZ, 1 ) = COMP                                       HYD02390
      TEMPR = 0.0                                                       HYD02400
      DEMAND(KN,IS,MO) = DEMAND(KN,IS,MO) - QINFLO(KP,KZ,1)             HYD02410
      CONST = DEMAND(KN,IS,MO)                                          00002415   B
      GO TO 180                                                         00002416   B
C**** THIS DEMAND REPRESENTS A SUBSURFACE FLOW THAT IS TRANSFERRED      HYD02420
C**** OUT OF SYSTEM                                                     HYD02430
  340 IF ( TEMPR . LT. 0.0 )  GO TO 1020                                HYD02440
      GO TO 190                                                         HYD02450
C**** THIS IS A RESERVOIR UPDATE                                        HYD02460
C**** THIS PORTION OF THE PROGRAM INCLUDES THE VOLUME AND CHEMISTRY     HYD02470
C**** UPDATES FOR ALL INFLOWS TO THE NODE                               HYD02510
  400 IF(KN .EQ. 2)GO TO 399                                            HYD02520
      GO TO(409,409,402,403,409,404,405,409,409,409),IS                            B
  399 GO TO(409,409,402,403,409,409,409,409,409),IS                                B
  402 QINFLO(KN,3,1)=DEMAND(KN,1,MO)                                               B
      GO TO 409                                                                    B
  403 DEXCS(KN,1)=QINRIV(1)-QINFLO(KN,3,1)                                         B
      DO 406 K=2,10                                                                B
  406 DEXCS(KN,K)=QINRIV(K)                                                        B
      GO TO 409                                                                    B
  404 DO 407 K=2,10                                                                B
  403 QINFLO(1,6,K)=QIOSP(1,K)                                               B
      GO TO 409                                                              B
  405 QINFLO(1,7,1)=DEMAND(1,1,MO)-ELPASO                                    B
      DO 408 K=2,10                                                          B
  408 QINFLO(1,7,K)=QINFLO(1,1,K)                                            B
  409 DO 410 K=1,10                                                          A
      TEMP (K) = QINFLO ( KN, IS, K )                              HYD02540
  410 CONTINUE                                                     HYD02550
      TEST = QINFLO (KN, IS, 11 )                                  HYD02560
      CONST = QINFLO (KN, IS, 1 )                                  HYD02570
      IF ( TEST . NE. 1.0 )  GO TO 430                             HYD02580
C**** THIS IS AN INFLOW TO THE RIVER                                HYD02590
      IF(QINRIV(1) .EQ. 0.0 .AND. CONST .EQ. 0.0)GO TO 500                   B
      CALL CHEMRV ( QINRIV, CONST, KN, IS )                        HYD02600
      QINRIV(1) = QINRIV (1) + CONST                               HYD02610
      GO TO 500                                                    HYD02620
  430 IF ( TEST . NE. 2.0 )  GO TO 440                             HYD02630
C**** THIS IS AN INFLOW TO THE AQUIFER                              HYD02640
      IF(TEMP(1) .EQ. 0.0 .AND. CONST .EQ. 0.0)GO TO 500                     B
      CALL CHEMGR ( TEMP, CONST, KN, IS )                          HYD02650
      GRTANK ( KN, 1) = GRTANK (KN, 1 ) + CONST                    HYD02660
      GO TO 500                                                    HYD02670
  440 IF ( TEST . NE. 3.0 )  GO TO 450                             HYD02680
C**** THIS IS AN INFLOW TO THE PONDING POOL                         HYD02690
      IF(TEMP(1) .EQ. 0.0 .AND. CONST .EQ. 0.0)GO TO 500                     B
      CALL CHEMTT ( TEMP, CONST, KN, IS )                          HYD02700
      TTANK ( KN, 1 ) = TTANK ( KN, 1 ) + CONST                    HYD02710
      GO TO 500                                                    HYD02720
  450 IF ( TEST .NE. 4.0 )  GO TO 1000                             HYD02730
C**** AT THIS POINT IN THE MODEL CRITERIA FOR THE OPERATION OF THE  HYD02740
C**** SYSTEM IS REQUIRED.  THE OPERATIONAL CRITERIA SHOULD BE FORMULATEDHYD02750
C**** AND INSERTED AS A SUBROUTINE OR A SERIES OF SUBROUTINES AND/OR   HYD02760
C**** FUNCTIONS WHICH ARE MONITORED BY THE SUBROUTINE CALLED AT THIS   HYD02770
C**** POINT.  THE TECHNIQUE AS OUTLINED DOES NOT DESTROY THE        HYD02780
C**** GENERALIZED CONCEPT OF THE MODEL.                             HYD02790
C**** THIS AN OBSERVED CHECK POINT                                  HYD02800
C**** CALL VERNAL SUBROUTINE TO SIMULATE TRANSFERS OF FLOW          HYD02810
C**** BETWEEN SURFACE AND SUBSURFACE FACILITIES TO OBTAIN HYDRAULIC HYD02820
C**** BALANCE IN NODE                                               HYD02830
      CALL VERNAL (KN,IS,MO,OBSERV,QINRIV)                         HYD02840
  500 CONTINUE                                                     HYD02850
C**** CHECK TO DETERMINE IF A SOIL COLUMN EXISTS IN THIS NODE       HYD02860
      IF ( TTANK ( KN, 1 ) . LE. 0.0 ) GO TO 540                   HYD02870
C**** CHECK TO DETERMINE IF SOIL COLUMN DATA EXISTS FOR THIS NODE   HYD02880
      NSOIL = NSEG (KN )                                           HYD02890
      IF ( NSOIL . EQ. 0 ) GO TO 1030                              HYD02900
C**** SOIL COLUMN DATA EXISTS PERCOLATE WATERS IN TTANK THROUGH     HYD02910
C**** SOIL COLUMN INTO BTANK                                        HYD02920
      CALL SOILCO ( KN, IW, IR, NSOIL )                            HYD02930
C**** UPDATE AQUIFER WITH LINEAR MIX WITH WATER IN BTANK            HYD02940
      BTANK (KN, 1) = TTANK ( KN, 1 )                              HYD02950
      DO 520 K = 1, 10                                             HYD02960
      TEMP (K) = BTANK ( KN, K )                                   HYD02970
  520 CONTINUE                                                     HYD02980
      CALL CONVER ( TEMP , 2 ,IW)                                  HYD02990
      CALL CHEMBT ( TEMP , 0., KN, 1 )                             HYD03000
C**** SET UP TRANSFERS OF OUTFLOW FROM THIS NODE TO NEXT LOWER      HYD03010
C**** NODE - WHERE ND= NODE NUMBER OF NEXT LOWER NODE AND NS =      HYD03020
C**** ENTERING SEQUENCE OF NEXT LOWER NODE                          HYD03030
  540 ND = NCTRL ( KN, 2 )                                         HYD03040
      IF ( KN . EQ. NUMNOD )  GO TO 560                            HYD03050
      ND = NFIND (ND)                                              HYD03060
      NS = NCTRL ( KN, 3 )                                         HYD03070
      DO 550 K = 1, 10                                             HYD03080
      QINFLO (ND, NS, K) = OBSERV (K)                              HYD03090
  550 CONTINUE                                                     HYD03100
  560 DO 570 K = 1, 10                                             HYD03110
      PREDIC ( KN, K ) = QINRIV (K)                                HYD03120
      OBSVAL ( KN, K ) = OBSERV (K)                                HYD03130
  570 CONTINUE                                                     HYD03140
  600 CONTINUE                                                     HYD03150
      CALL WRIT(MO,IYR,IW,KKOUNT,CYO,CYP,TX,QEXCS)                           A
      KYR=IYR+1900                                                           B
      MO = MO + 1                                                  HYD03170
      KMONTH=MO-1                                                            B
      IF(IYR .EQ. IYREND .AND. MO .GT. MOEND)WRITE(7,749)KYR,KMONTH,         B
     < GRTANK(1,1),GRTANK(1,10),GRTANK(2,1),GRTANK(2,10)                     B
  749 FORMAT(I5,I3,' 1',2F10.1,'     2',2F10.1)                              B
      IF(IYR.EQ.IYREND .AND. MO.GT.MOEND)CALL GRAFF(CYO,CYP,TX,KKOUNT,       B
     < MOBEG,IYRBEG)                                                         B
      IF(IYR.EQ.IYREND .AND. MO.GT. MOEND)CALL EXIT                          B
      IF ( MO . LE. 12 ) GO TO 750                                 HYD03180
      MO = 1                                                       HYD03190
      IYR = IYR + 1                                                HYD03200
  750 IF ( IYR . LT. IYREND )  GO TO 770                           HYD03210  C1
  770 JREAD = 5                                                    HYD03230
      CALL PERUSE(JREAD,IW,IR,ELPASO)                                        A
      GO TO 10                                                     HYD03250
C**** PROGRAM CONTROLLED ERROR MESSAGES ARE GENERATED HERE          HYD03260
 1000 WRITE ( IW, 1005 ) TEST                                      HYD03270
 1005 FORMAT ( 1H1, 7X, 20HDESTINATION INDEX = ,F3.0,12H IS IN ERROR )  HYD03280
      GO TO 1500                                                   HYD03290
 1010 WRITE ( IW, 1015)                                            HYD03300
 1015 FORMAT(1H1,7X,45HDEMAND LEAVING SYSTEM FROM SURFACE IN DEFICIT)  HYD03310
      GO TO 1500                                                   HYD03320
 1020 WRITE ( IW, 1025 )                                           HYD03330
 1025 FORMAT(1H1,7X,48HDEMAND LEAVING SYSTEM FROM SUBSURFACE IN DEFICIT)HYD03340
      GO TO 1500                                                   HYD03350
 1030 WRITE ( IW , 1035 )                                          HYD03360
 1035 FORMAT ( 1H1, 7X, 25HNO SOIL COLUMN DATA FOUND    )          HYD03370
      GO TO 1500                                                   HYD03380  C6
 1060 WRITE ( IW , 1065 )                                          HYD03450
 1065 FORMAT ( 1H1, 7X, 42HSURFACE TRANSFER AS A DEMAND IS IN DEFICIT ) HYD03460
      GO TO 1500                                                   HYD03470
 1070 WRITE ( IW , 1075 )                                          HYD03480
 1075 FORMAT ( 1H1, 7X,45HSUBSURFACE TRANSFER AS A DEMAND IS IN DEFICIT)HYD03490
      GO TO 1500                                                   HYD03500
 1500 WRITE ( IW, 1510 ) KN , IS                                   HYD03510
 1510 FORMAT ( 8X, 12HFOR NODE =   , I3, 8X, 10HSEQ.NO. =  , I3 )  HYD03520
      CALL EXIT                                                    HYD03530
      END                                                          HYD03540
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ORY REQUIREMENTS 001ECC BYTES

GHEST SEVERITY CODE WAS  0

      SUBROUTINE PERUSE(JREAD,IW,IR,ELPASD)
       COMMON / GENRL / LTITLE(16),NCTRL( 5, 3), MOBEG, IYRBEG, MOEND, IHYD03560
     AYREND, NUMNOD, ISEQ( 5, 20), KPRT, NUMSEQ( 5), NOWTR( 5, 20)      HYD03570
       COMMON / RESER /
     $ QINFLO(5,10,12),DEMAND(5,10,16),K                                HYD00090 A
     3DEMNM( 5, 10,16), KQINNM( 5, 10,16) , KAQUNM (5,16)               HYD00100
       COMMON / PROPER / SOIL( 5, 10, 21), RTANK( 5, 10), TTANK( 5, 10),HYD03630
     1 GRTANK( 5, 10)  , NSEG ( 5) , CONUSE ( 5, 10, 30)                HYD03640
      DIMENSION KUSE(5,10,30)
      EQUIVALENCE ( CONUSE, KUSE )                                      HYD03660
       DIMENSION LTEMP(22), CTEMP(15),NTEMP(16)                         HYD03670
      REAL * 8 ICHK,$SC1/'CONUSE  '/
      INTEGER  $CON/'CON '/,$NOD/'NOD '/,$SEQ/'SEQ '/,$WAT/'WAT '/,$END
     1/'END'/,$AQU/'AQU '/,$SUR/'SUR '/,$RES/'RES '/,$CHM/'CHM '/,$GRT
     2/'GRT '/,$COL/'COL '/,$REG/'REG '/,$SEG/'SEG '/,$EQU/'EQU '/,$SED
     3/'SED '/,$TWR/'TWR '/,$EFF/'EFF '/,$CAP/'CAP '/,$POW/'POW '/,$RUL
     4/'RUL '/,$EVP/'EVP '/,$BNK/'BNK '/,$DEM/'DEM '/,$GWR/'GWR '/,$IRR
     5/'IRR '/,$MAT/'MAT '/,$GWV/'GWV '/,$OUT/'OUT '/,$QIN/'QIN '/,$CHK/
     6'CHK '/,$TRN/'TRN '/,$TDA/'TDA '/,$PDA/'PDA '/,$ENE/'ENE '/
C**** SET READ AND WRITE LOGICAL UNITS                                  HYD03680
C**** WRITE INPUT LISTING HEADING AND VALUES OF JREAD                   HYD03690
      WRITE ( IW, 10 )                                                  HYD03700
   10 FORMAT  (1H1, 24X, 33H ***  LISTING OF INPUT DATA  ***  / / )     HYD03710
      WRITE ( IW , 30 ) JREAD                                           HYD03720
   30 FORMAT  (1H , 8HJREAD = , I3 )                                    HYD03730
C                                                                       HYD03740
C***** WHEN JREAD = 1 READ AND STORE SYSTEM STRUCTURE - CONCLUDE THIS   HYD03750
C*****READ WITH CARD CONTAINING THE WORD CONEND IN THE FIRST SIX COLUMNSHYD03760
C                                                                       HYD03770
C*****WHEN JREAD = 2 READ AND STORE TITLES AND INITIAL CONDITIONS OF    HYD03780
C*****SURFACE RESERVOIRS AND AQUIFERS ( SUBSURFACE RESERVOIRS).         HYD03790
C*****ALSO  WHEN JREAD = 2 READ AND STORE INITIAL SOIL CONTITIONS AS    HYD03800
C*****WELL AS SOIL COLUMN PHYSICAL FEATURES. CONCLUDE THIS READ WITH    HYD03810
C*****CARD CONTAINING THE WORD COLEND IN THE FIRST SIX COLUMNS          HYD03820
C                                                                       HYD03830
C*****WHEN JREAD = 3 READ AND STORE MATHEMATICAL REPRESENTATIONS OF     HYD03840
C*****PERTINENT SURFACE FACILITIES PHYSICAL FEATURES . CONCLUDE THIS    HYD03850
C*****READ WITH CARD CONTAINING EQUEND IN THE FIRST SIX COLUMNS         HYD03860
C                                                                       HYD03870
C*****WHEN JREAD = 4 READ INFLOWS AND DEMANDS WITH TITLES FOR THE FIRST HYD03880
C*****FRAME ONLY NOTE ** TITLE MUST PRECEDE EACH INFLOW AND DEMAND DATA HYD03890
C*****CONCLUDE THIS READ WITH CARD CONTAINING THE WORD ENDATA IN THE    HYD03900
C*****FIRST SIX COLUMNS                                                 HYD03910
C                                                                       HYD03920
C*****WHEN JREAD = 5 READ INFLOW AND DEMAND DATA CARDS SUSEQUENT TO THE HYD03930
C*****FIRST TIME FRAME AS WELL AS ANY TRANSACTION CARDS-- CONCLUDE THIS HYD03940
C*****READ WITH CARD CONTAINING THE WORD ENDATA IN THE FIRST SIX COLUMNSHYD03950
      FTFAC=1.7                                                                  B
      E1=0.50                                                                    B
      E2=0.50                                                                    B
      GO TO ( 40, 220, 2000, 600, 650 ) , JREAD                         0HYD0396
C**** READ SYSTEM CONTROL CARDS                                         HYD03970
   40 READ ( IR, 60 ) LTITLE, KPRT                                      HYD03980
   60 FORMAT (16A4, I16)                                                HYD03990
      WRITE ( IW, 80 ) LTITLE , KPRT                                    HYD04000
   80 FORMAT  (1H ,16A4, I16)                                           HYD04010
      JK= 0                                                             HYD04020
      JJ = 0                                                            HYD04030
  100 READ (IR,120)IONE,ITWO,(LTEMP(I),I=1,22)                                   A
  120 FORMAT  (2A3,22I3)                                                HYD04050 A
      WRITE(IW,140)IONE,ITWO,(LTEMP(I),I=1,22)
  140 FORMAT  (1H , 2A3,22I3)                                           HYD04070
C**** STORE SYSTEM CONTROL DATA                                         HYD04080
      IF ( IONE . NE.  $CON )   GO TO 1000                              HYD04090
      IF ( ITWO . NE.  $NOD )  GO TO 160                                HYD04100
      JK = JK + 1                                                       HYD04110
      NUMNOD = JK                                                       HYD04120
      DO 150 K = 1, 3                                                   HYD04130
      NCTRL (JK, K ) = LTEMP (K)                                        HYD04140
  150 CONTINUE                                                          HYD04150
      GO TO 100                                                         HYD04160
  160 IF ( ITWO . NE.  $SEQ ) GO TO 190                                 HYD04170
      JK = NFIND ( LTEMP (1) )                                          HYD04180
C**** STORE NUMBER OF SEQUENCE POINTS IN A NODE                         HYD04190
      NUMSEQ (JK) = LTEMP (2)                                           HYD04200
      NS = LTEMP (2)                                                    HYD04210
C**** CHECK TO DETERMINE IF NUMBER OF SEQUENCE POINTS EXCEED 20         HYD04220
      IF ( NS . GT. 20 )  GO TO 1020                                    HYD04230
      DO 170 K = 1, NS                                                  HYD04240
      KX = K + 2                                                        HYD04250
      ISEQ (JK, K ) = LTEMP (KX)                                        HYD04260
  170 CONTINUE                                                          HYD04270
      GO TO 100                                                         HYD04280
  190 IF ( ITWO . NE.  $WAT )  GO TO 210                                HYD04290
      JK = NFIND ( LTEMP (1) )                                          HYD04300
C**** STORE SYSTEM FLOW ARRAY                                           HYD04310
      DO 200 K = 1, 20                                                  HYD04320
      KX = K + 2                                                        HYD04330
      NOWTR ( JK, K ) = LTEMP (KX)                                      HYD04340
  200 CONTINUE                                                          HYD04350
      GO TO 100                                                         HYD04360
  210 IF ( ITWO . NE.  $END )  GO TO 1040                               HYD04370
C**** STORE DATES FOR BEGINNING AND END OF STUDY PERIOD                 HYD04380
      MOBEG = LTEMP (1)                                                 HYD04390
      IYRBEG = LTEMP (2)                                                HYD04400
      MOEND = LTEMP (3)                                                 HYD04410
      IYREND = LTEMP (4)                                                HYD04420
      GO TO 2000                                                        HYD04430
C**** READ AND STORE INITIAL VALUES AND MATHEMATICAL REPRESENTATIONS    HYD04440
C**** OF SYSTEM PHYSICAL FEATURES AS WELL AS TITLES OF SAME IF          HYD04450
C**** APPLICABLE - SOIL COLUMN INITIAL AND PHYSICAL DATA ARE INCLUDED   HYD04460
C**** IN THIS PORTION OF THE SUBROUTINE                                 HYD04470
  220 READ  (IR, 230) IONE, ITWO, (LTEMP(I), I = 1, 3),(NTEMP(J),J=1,16)HYD04480
  230 FORMAT  (2A3,I2, 1X, I3, A3, 16A4)                                HYD04490
      WRITE  (IW, 240) IONE, ITWO, (LTEMP(I), I = 1,3),(NTEMP(J),J=1,16)HYD04500
  240 FORMAT  (1H , 2A3,I2, 1X, I4, I3, 16A5)                           HYD04510
      IF ( IONE . NE.  $AQU ) GO TO 370                                 HYD04520
C**** STORE TITLE OF AQUIFER ( SUBSURFACE RESERVOIR )                   HYD04530
      JK = NFIND ( LTEMP (2) )                                          HYD04540
      DO 250 K = 1, 16                                                  HYD04550 C2
      KAQUNM(JK,K)=NTEMP(K)                                                      A
  250 CONTINUE                                                          HYD04580 C7
      READ  (IR, 290) IONE, ITWO, (LTEMP(I), I = 1, 4), (CTEMP(J), J = 1HYD04660
     A, 10), (LTEMP(K), K = 5, 7)                                       HYD04670
  290 FORMAT  (2A3,I2, I1, I3, A3, 10F6.0, I2, I1, I2)                  HYD04680
      WRITE  (IW, 300) IONE, ITWO, (LTEMP(I), I = 1, 4), (CTEMP(J), J = HYD04690
     A1, 10), (LTEMP(K), K = 5, 7)                                      HYD04700
  300 FORMAT(1H ,2A3,I2,I1,I3,A3,F7.0,9F6.1,I2,I1,I2)                   HYD04710
  340 IF ( IONE . NE.  $GRT )  GO TO 1220                               HYD05050
C**** STORE INITIAL CAPACITY AND CHEMISTRY FOR AQUIFER                  HYD05060
      JK = NFIND ( LTEMP(3))                                            HYD05070
C**** CHECK TO DETERMINE IF ONLY TOTAL SALTS IN PPM ARE REPORTED        HYD05080
      IF(CTEMP (10) . GT. 0.0 )  GO TO 350                              HYD05090
C**** CONCENTRATIONS OF CONSTITUENTS ARE REPORTED CONVERT TO PPM        HYD05100
C**** AND COMPUTE TOTAL SALTS ON BASIS OF CONCENTRATIONS                HYD05110
      CALL CONVER ( CTEMP, LTEMP (2),IW)                                HYD05120
  350 DO 360 K = 2, 10                                                  HYD05130
      GRTANK ( JK, K ) = CTEMP (K)                                      HYD05140
  360 CONTINUE                                                          HYD05150
      NEXP = LTEMP (6)                                                  HYD05160
      FAC = 10.0 ** NEXP                                                HYD05170
      GRTANK ( JK, 1 ) = CTEMP (1) * FAC                                HYD05180
      GO TO 220                                                         HYD05190
C**** READ SOIL DATA FOR SOIL COLUMN - EACH SEGMENT IN SOIL COLUMN MUST HYD05200
C**** BE IN PROPER SEQUENCE.  SEGMENT NUMBER ONE IS SEGMENT NEAREST     HYD05210
C**** GROUND SURFACE.                                                   HYD05220
  370 IF ( IONE . NE.  $COL  ) GO TO 1080                               HYD05230
      IF ( ITWO .EQ.  $END )   GO TO 2000                               HYD05240
      IF ( ITWO . NE.  $REG  ) GO TO 1100                               HYD05250
      LSEG = 0                                                          HYD05260
      KNODE = LTEMP(2)                                                  HYD05270
      JK = NFIND (KNODE )                                               HYD05280
      NSEG ( JK) = LTEMP (1)                                            HYD05290
      LNODE = KNODE                                                     HYD05300
      MAX = NSEG (JK)                                                   HYD05310
      DO 400 J = 1, MAX                                                 HYD05320
      READ(IR,380) IONE,ITWO, (LTEMP (KA), KA=1,2), (CTEMP(KB),KB=1,15) HYD05330
  380 FORMAT(2A3,2I3,8F5.0,F3.0,3F5.0, F1.0, F4.0,F5.0)                 HYD05340
      WRITE(IW,390)IONE,ITWO, (LTEMP (KA), KA=1,2), (CTEMP(KB),KB=1,15) HYD05350
  390 FORMAT(1H ,2A3,2I3,1X,9(F6.1,1X),F3.2,1X,3(F5.2,1X),F1.0,1X,F4.2, HYD05360
     <1X,F5.1)                                                          HYD05361
      IF ( IONE .NE.  $COL )   GO TO 1100                               HYD05370
      IF ( ITWO .NE.  $SEG  )    GO TO 1100                             HYD05380
      KNODE = LTEMP (1)                                                 HYD05390
      IF ( KNODE . NE. LNODE  ) GO TO 1100                              HYD05400
      LSEG = LSEG + 1                                                   HYD05410
      IF ( LSEG .NE. LTEMP (2)) GO TO 1100                              HYD05420
      KS = LSEG                                                         HYD05430
      DO 400 K = 1, 15                                                  HYD05440
      SOIL ( JK, KS, K ) = CTEMP (K)                                    HYD05450
  400 CONTINUE                                                          HYD05460

      GO TO 220                                                         HYD05470
C**** READ AND STORE INFLOW, DEMAND, AND CONSUMPTIVE USE CARDS FOR FIRSTHYD06070
C**** TIME FRAME ONLY WHERE TITLE CARDS MUST PRECEDE DATA CARDS         HYD06080
  600 IF ( JREAD . GT. 4 )  GO TO 650                                   HYD06090
      READ ( IR , 230 ) IONE , ITWO,(LTEMP(K),K=1,3),(NTEMP(J),J=1,16)  OHYD0610
      WRITE ( IW, 240 ) IONE , ITWO, (LTEMP(K),K=1,3),(NTEMP(J),J=1,16) HYD06110
      IF ( IONE . EQ.  $END )  GO TO 2000                               HYD06120
      IF ( IONE . NE.  $SUR )  GO TO 1180                               HYD06130
      JK = NFIND ( LTEMP (2) )                                          HYD06140
      IS = LTEMP (1)                                                    HYD06150
      IF ( ITWO . NE.  $DEM ) GO TO 620                                 HYD06160
C**** STORE TITLE OF DEMAND OR DIVERSION REQUIREMENT                    HYD06170
      DO 610 K = 1, 16                                                  HYD06180
      KDEMNM ( JK, IS, K) = NTEMP(K)                                    HYD06200
  610 CONTINUE                                                          HYD06210
      GO TO 650                                                         HYD06220
C**** STORE TITLE OF INFLOW SOURCE                                      HYD06230
  620 DO 630 K= 1, 16                                                   HYD06240
      KQINNM ( JK, IS, K ) = NTEMP(K)                                   HYD06260
  630 CONTINUE                                                          HYD06270
C**** READ AND STORE INFLOW , DEMAND AND CONSUMPTIVE USE DATA AS WELL ASHYD06280
C**** TRANSACTION CARDS ( USED FOR BOTH JREAD = 4 AND 5 )               HYD06290
  650 READ  (IR, 290) IONE, ITWO, (LTEMP(I), I = 1, 4), (CTEMP(J), J = 1HYD06300
     A, 10), (LTEMP(K), K = 5, 7)                                       HYD06310
      WRITE  (IW, 300) IONE, ITWO, (LTEMP(I), I = 1, 4), (CTEMP(J), J = HYD06320
     A1, 10), (LTEMP(K), K = 5, 7)                                      HYD06330
      IF ( IONE . EQ.  $END ) GO TO 2000                                HYD06340
      JK = NFIND ( LTEMP (3) )                                          HYD06350
      IS = LTEMP (1)                                                    HYD06360
      MO = LTEMP (5)                                                    HYD06370
C**** RAISE MAGNITUDE OF DEMAND BY POWER OF 10 ( LTEMP (6) )            HYD06380
      NEXP = LTEMP (6)                                                  HYD06390
      FAC = 10.0 ** NEXP                                                HYD06400
      CTEMP (1) = CTEMP (1) * FAC                                       HYD06410
      IF(JK .EQ. 2)GO TO 651                                                    B
      IF(LTEMP(4) .NE. $CHK)GO TO 651                                           B
      IF(IS .NE. 5)GO TO 653                                                    B
      ELPASO=CTEMP(1)                                                           B
      GO TO 651                                                                 B
  653 IF(IS .NE. 6)GO TO 651                                                    B
      DO 652 J=2,10                                                             B
  652 CTEMP(J)=GRTANK(1,J)                                                      B
  651 CONTINUE                                                                  B
      IF ( IONE . NE.  $DEM )  GO TO 700                                HYD06420
C**** STORE DEMAND DATA WITH OR WITHOUT REQUIRED CONSUMPTIVE USE DATA   HYD06430
      DEMAND ( JK, IS, MO ) = CTEMP (1)                                 HYD06440
C**** STORE SOURCE INDICATOR IN LOCATION 13 OF DEMAND ARRAY             HYD06450
C**** SYMBOLICALLY THERE ARE ONLY TWO SOURCES SUPPLYING DEMANDS         HYD06460
C**** NAMELY , SURFACE AND SUBSURFACE SOURCES                           HYD06470
      IF ( ITWO . EQ.  $SUR ) DEMAND ( JK, IS, 13 ) = 1.0               HYD06480
      IF ( ITWO . EQ.  $GWR ) DEMAND ( JK, IS, 13 ) = 2.0               HYD06490
C**** IN LOCATION 14 OF THE DEMAND ARRAY IS STORED THE USE IF IRRIGATIONHYD06500
C**** OR MUNICIPAL AND INDUSTRIAL OR THE DESTINATION IN A TRANSFER OF   HYD06510
C**** FLOWS FROM FACILITY TO FACILITY                                   HYD06520
      IF ( LTEMP (4) . EQ.  $IRR ) DEMAND ( JK, IS, 14 ) = 1.0          HYD06530
      IF ( LTEMP (4) . EQ.  $MAI ) DEMAND ( JK, IS, 14 ) = 2.0          HYD06540
      IF ( LTEMP (4) . EQ.  $GWP ) DEMAND ( JK, IS, 14 ) = 3.0           HYD06550
      IF ( LTEMP (4) . EQ.  $GWV ) DEMAND ( JK, IS, 14 ) = 4.0           HYD06560
      IF ( LTEMP (4) . EQ.  $SUR ) DEMAND ( JK, IS, 14 ) = 5.0           HYD06570
      IF ( LTEMP (4) . EQ.  $CUT ) DEMAND ( JK, IS, 14 ) = 6.0           HYD06580
C**** LTEMP (2) CONTAINS INDICATOR DESIGNATING CONSUMPTIVE USE DATA      HYD06590
C**** OR TRANSFER DATA WILL OR WILL NOT FOLLOW DEMAND CARD               HYD06600
      IF ( LTEMP (2) .NE. 1 )  GO TO 600                                 HYD06610
      READ ( IR, 660 ) ICHK,(LTEMP(K),K=1,2),(CTEMP(KA),KA=1,3),         HYD06620
     1            (LTEMP (KB) , KB = 3, 16 )                             HYD06630
  660 FORMAT ( A6, I3, I2, F9.0, 2F3.0, 3 ( A3, I3, I2, I3) , 16X, I2 ,  HYD06640
     1            1X, I2 )                                               HYD06650
      WRITE ( IW, 670) ICHK,(LTEMP(K),K=1,2),(CTEMP(KA),KA=1,3),         HYD06660
     1            (LTEMP (KB) , KB = 3, 16 )                             HYD06670
  670 FORMAT(1H ,A6,I3,I2, F9.0, 2F3.0, 3 ( A3, I3, I2, I3) , 16X, I2 ,  HYD06680
     1            1X, I2 )                                               HYD06690
C**** CONSUMPTIVE USE OR TRANSFER DATA WILL BE READ AND STORED           HYD06700
      IF ( ICHK . NE. $SC1      )  GO TO 1160                            HYD06710
      JK = NFIND ( LTEMP (1) )                                           HYD06720
      IS = LTEMP (2)                                                     HYD06730
      MO = LTEMP ( 15)                                                   HYD06740
      CONUSE ( JK, IS, MO ) = CTEMP (1)                                  HYD06750
      CONUSE ( JK, IS, 13 ) = CTEMP (2)                                  HYD06760
      CONUSE ( JK, IS, 14 ) = CTEMP (3)                                  HYD06770
      IF(IS.NE.3)GO TO 2001                                                     B
      CONUSE(JK,IS,MO)=CTEMP(1)*ETFAC                                           B
      D1=CONUSE(JK,IS,MO)/E1                                                    B
      D2=CONUSE(JK,IS,MO)/E2                                                    B
      DELO=(D1-D2)/2.0                                                          B
      DELOW=D1-D2                                                               B
 2004 DEMAND(JK,IS,MO)=D2                                                       B
      WRITE(6,2002)DEMAND(JK,IS,MO),CONUSE(JK,IS,MO),E2,ETFAC                   B
 2002 FORMAT(//,25X,'*** CALCULATED INPUT DATA ***',//,20X,'IRRIGATION D        B
     <EMAND = ',F8.1,/,20X,'CONSUMPTIVE USE = ',F8.1,3X,'BOTH CALCULATED        B
     < WITH IRR. EFF. = ',F4.2,/,50X,'AND ET*FACTOR = NEW ET. WITH FACTO        B
     <R = ',F6.3)                                                               B
      WRITE(6,2003)D1,E1,DELOW                                                  B
 2003 FORMAT(//,20X,'OLD IRRIGATION DEMAND = ',F8.1,/,20X,'OLD IRRIGATIO        B
     <N EFF. = ',F5.2,/,20X,'DEMAND DIFF. (WATER SAVINGS) = ',F8.1,/)           B
      IF(DEMAND(JK,1,MO) .EQ. 0.0)GO TO 2001                                    B
      DEMAND(JK,1,MO)=DEMAND(JK,1,MO)-DELO                                      B
      IF(DEMAND(JK,1,MO) .LT. 0.0)DEMAND(JK,1,MO)=0.0                           B
 2001 CONTINUE                                                                  B
      DO 680 K = 3, 14                                                   HYD06780
      KA = K + 16                                                        HYD06790
      KUSE ( JK, IS, KA ) = LTEMP (K)                                    HYD06800
  680 CONTINUE                                                           HYD06810
      GO TO 600                                                          HYD06820
  700 IF ( IONE . NE.  $QIN )  GO TO 740                                 HYD06830
C**** STORE INFLOW DATA WITH OR WITHOUT BREAKDOWN OF CHEMICAL            HYD06840
C**** CONSTITUENTS - LTEMP (2) DESIGNATES UNITS OF INPUT I.E. 1 = MEQ/   HYD06850
C**** LITER AND 2 = PPM                                                  HYD06860
C**** LOCATION 11 IN THE QINFLO ARRAY DESIGNATES THE DESTINATION OF      HYD06870
C**** THE PARTICULAR SOURCE                                              HYD06880
      IF ( LTEMP (4) .EQ.  $SUR )  QINFLO (JK, IS, 11 ) = 1.0            HYD06890
      IF ( LTEMP (4) .EQ.  $GWP )  QINFLO (JK, IS, 11 ) = 2.0            HYD06900
      IF ( LTEMP (4) .EQ.  $GWV )  QINFLO (JK, IS, 11 ) = 3.0            HYD06910

      IF ( LTEMP (4) .EQ.  $CHK )  QINFLO (JK, IS, 11 ) = 4.0            HYD06920
      DO 710 K = 1, 10                                                   HYD06930
      QINFLO (JK, IS, K ) = 0.0                                          HYD06940
  710 CONTINUE                                                           HYD06950
      IF ( CTEMP (1) . LE. 0.0 )  GO TO 600                              HYD06960
      QINFLO (JK, IS, 1 ) = CTEMP (1)                                    HYD06970
C**** CHECK TO DETERMINE IF DATA CONCERNING CHEMICAL CONSTITUENTS        HYD06980
C**** ARE PART OF THIS DATA                                              HYD06990
      IF ( CTEMP (2) . GT. 0.0 ) GO TO 720                               HYD07000
C**** CARD DOES NOT CONTAIN DATA FOR CHEMICAL CONSTITUENTS               HYD07010
      QINFLO ( JK, IS, 10) = CTEMP (10)                                  HYD07020
      GO TO 600                                                          HYD07030
C**** CARD CONTAINS DATA FOR CHEMICAL CONSTITUENTS                       HYD07040
  720 CALL CONVER ( CTEMP , LTEMP (2),IW)                                HYD07050
      DO 730 K = 2, 10                                                   HYD07060
      QINFLO (JK, IS, K ) = CTEMP (K)                                    HYD07070
  730 CONTINUE                                                           HYD07080
      QINFLO ( JK, IS, 12 ) = LTEMP (2)                                  HYD07090
      GO TO 600                                                          HYD07100
  740 IF ( IONE . NE.  $TRN )  GO TO 1200                                HYD07110
      GO TO 600                                                          HYD07380
C**** ALL PROGRAM CONTROLLED ERROR MESSAGES ARE GENERATED HERE           HYD07390
 1000 WRITE ( IW, 1010 )                                                 HYD07400
 1010 FORMAT ( 1H1, 7X, 26HTHIS IS NOT A CONTROL CARD  )                 HYD07410
      CALL EXIT                                                          HYD07420
 1020 WRITE ( IW , 1030 )                                                HYD07430
 1030 FORMAT ( 1H1, 7X, 36HNUMBER OF SEQUENCE POINTS EXCEEDS 20 )        HYD07440
      CALL EXIT                                                          HYD07450
 1040 WRITE ( IW , 1050 )                                                HYD07460
 1050 FORMAT ( 1H1, 7X, 36HNO END SIGNAL FOUND FOR CONTROL DATA  )       HYD07470
      CALL EXIT                                                          HYD07480
 1060 WRITE ( IW , 1070 )                                                HYD07490
 1070 FORMAT ( 1H1, 8X, 33HRESERVOIR CHEMISTRY CARD MISSING   )          HYD07500
      CALL EXIT                                                          HYD07510
 1080 WRITE ( IW , 1090 )                                                HYD07520
 1090 FORMAT ( 1H1, 7X, 34HDATA FOR JREAD = 3 IS OUT OF ORDER )          HYD07530
      CALL EXIT                                                          HYD07540
 1100 WRITE ( IW , 1110 )                                                HYD07550
 1110 FORMAT ( 1H1, 7X, 29HSOIL COLUMN DATA OUT OF ORDER  )              HYD07560
      CALL EXIT                                                          HYD07570
 1160 WRITE ( IW , 1170)                                                 HYD07640
 1170 FORMAT ( 1H1, 8X, 30HNO CONSUMPTIVE USE CARD FOUND  )              HYD07650
      CALL EXIT                                                          HYD07660
 1180 WRITE ( IW , 1190 )                                                HYD07670
 1190 FORMAT ( 1H1, 7X, 39HINFLOW OR DEMAND CARDS ARE OUT OF ORDER  )    HYD07680
      CALL EXIT                                                          HYD07690
 1200 WRITE ( IW, 1210 )                                                 HYD07700
 1210 FORMAT ( 1H1, 7X, 34HTRANSACTION CARDS ARE OUT OF ORDER  )         HYD07710
      CALL EXIT                                                          HYD07720
 1220 WRITE (IW , 1230 )                                                 HYD07730
 1230 FORMAT ( 1H1, 7X, 34HDATA FOR JREAD = 2 IS OUT OF ORDER )          HYD07740
      CALL EXIT                                                          HYD07750
 2000 RETURN                                                             HYD07760
      END                                                                HYD07770
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MEMORY REQUIREMENTS 002200 BYTES

HIGHEST SEVERITY CODE WAS  0

      SUBROUTINE WRIT(MO,IYR,IW,KKOUNT,CYO,CYP,TX,QEXCS)
      DIMENSION QEXCS(2,10)                                                      B
      DIMENSION CYO(122),CYP(122),TX(122)                                        B
       COMMON / GENRL / LTITLE(16),NCTRL( 5, 3), MOBEG, IYRBEG, MOEND, IHYD07790
     AYREND, NUMNOD, ISEQ( 5, 20), KPRT, NUMSEQ( 5), NDWTR( 5, 20)       HYD07800
       COMMON / RESER /                                                          A
     A QINFLO(5,10,12),DEMAND(5,10,16),K
     BDEMNM( 5, 10,16), KQINNM( 5, 10,16) , KAQUNM (5,16)                HYD00100
       COMMON / PROPER / SOIL( 5, 10, 21), RTANK( 5, 10), TTANK( 5, 10),HYD07860
     1 GRTANK( 5, 10)  , NSEG ( 5) , CONUSE ( 5, 10, 30)                 HYD07870
      DIMENSION KUSE(5,10,30)
       COMMON / PARAM / BEGRES (  5, 11 ) , BEGWR (  5, 10 ) ,           HYD07890
     1          PREDIC (  5, 10 ) , OBSVAL ( 5,10), CHEMOM (  5, 10, 10) HYD07900
      DIMENSION MON (12) , LTEMP (20 ) , TEMP (10),NTEMP(10)             HYD07910
      INTEGER $JAN/'JAN '/,$FEB/'FEB '/,$MAR/'MAR '/,$MAY/'MAY '/,$JUN
     1/'JUN '/,$JUL/'JUL '/,$AUG/'AUG '/,$SEP/'SEP '/,$OCT/'OCT '/,$NOV
     2/'NOV '/,$DEC/'DEC '/
      EQUIVALENCE ( CONUSE, KUSE )                                       HYD07920
      DATA MON/'JAN ','FEB ','MAR ','APR ','MAY ','JUN ','JUL ','AUG ',
     1'SEP ','OCT ','NOV ','DEC '/
      DATA    IPAGE / 0 /
      MONTH = MON (MO )                                                  HYD07960
      KYR = IYR + 1900                                                   HYD07970
      KMONTH=MO-1                                                                B
      KYEAR=KYR                                                                  B
      DO 700 KN = 1, NUMNOD                                              HYD07980
      IPAGE = IPAGE + 1                                                  HYD07990
      WRITE ( IW, 50)  (LTITLE (K) , K = 1,16 ) , IPAGE                  HYD08000
   50 FORMAT( 1H1, 7X,16A4, 3X, 19HNUMBER OF NODES = 2  , 6X,            HYD08010
     1        8HPAGE NO.  , I3 / )                                       HYD08020
      KNODE = NCTRL (KN,1)                                               HYD08030
      WRITE ( IW, 60 ) KNODE, MONTH, KYR                                 HYD08040
   60 FORMAT ( 8X, 14HNODE NUMBER =  , I3, 5X, 9HMONTH OF   , A3, 10X,   HYD08050
     1        5HYEAR   , I4 // 58X, 6HVOLUME, 4X, 2HCA , 4X, 2HMG, 4X,   HYD08060
     2        2HNA, 4X, 2HCL, 4X, 3HSO4 , 2X, 4HHCO3 , 3X, 3HCO3 , 3X,   HYD08070
     3        3HNO3 , 3X, 11HTOTAL SALTS / 56X, 9HACRE FEET,             HYD08080
     4        9 (3X, 3HPPM ) , 3X, 7HTONS/AF / )                         HYD08090
      WRITE ( IW, 70)                                                    HYD08100
   70 FORMAT ( 8X, 42HOPERATIONAL SEQUENCE OF SURFACE FACILITIES   / )  HYD08110
   95 GO TO (100,110),KN                                                 HYD08120 A
C
C     MA REFERS TO THE "IRRIGATION DEMAND" CARD OPERATION
C     NUMBER, FOR NODE 1 THIS SEQUENCE NUMBER IS -3, BUT IT IS THE 5TH
C     OPERATION IN THE NODE 1 SEQUENCE OF OPERATIONS.
C
C     MB REFERS TO THE 1ST OBSERVED OUTFLOW OPERATION NUMBER. FOR NODE 1
C     THIS SEQUENCE NUMBER IS 5, BUT IT IS THE 8TH OPERATION IN THE NODE
C     1 SEQUENCE OF OPERATIONS.
C

C     MC REFERS TO THE LAST OBSERVED OUTFLOW OPERATION NUMBER. FOR NODE
C     1 THIS SEQUENCE NUMBER IS 7, BUT IT IS THE 10TH OPERATION IN THE
C     NODE 1 SEQUENCE OF OPERATIONS.
C
C     MD REFERS TO THE "IRRIGATION RETURN FLOW" CARD NUMBER. FOR NODE 1
C     THIS SEQUENCE NUMBER IS 8, BUT IT IS THE 11TH OPERATION IN THE
C     NODE 1 SEQUENCE OF OPERATIONS.
  100 MA=5
      MB=8
      MC=10
      MD=11
      GO TO 150                                                          HYD08170
  110 MA=5
      MB=8
      MC=8
      MD=9

  150 NS = NUMSEQ ( KN )                                                 HYD08270 C5
      MARK = 0                                                           HYD08280
      DO 490 KS = 1, NS                                                  HYD08290
      IS = IABS (  ISEQ ( KN, KS ) )                                     HYD08300
C**** WRITE OUTPUT OF LINES CONTROLLED BY INDEX(MA) (INFLOWS- DEMANDS)  HYD08310
      IF ( KS. GT. MA )  GO TO 190                                       HYD08320
  160 IF ( ISEQ ( KN, KS ).GT. 0 ) GO TO 450                             HYD08330
      IF ( ISEQ ( KN, KS ).LT. 0 )  GO TO 300                            HYD08340
      GO TO 490                                                          HYD08350
  190 IF ( KS  . NE. MB )  GO TO 220                                     HYD08360
      WRITE ( IW , 210 )                                                 HYD08370
  210 FORMAT (/8X, 28HOBSERVED OUTFLOWS FROM NODE   / )                  HYD08380
  220 IF ( KS. LE. MC )  GO TO 450                                       HYD08390
      IF ( KS  . NE. MD )   GO TO 250                                    HYD08400
      WRITE ( IW , 230 )                                                 HYD08410
  230 FORMAT (/8X, 40HSUBSURFACE OPERATIONS AND FLOW TRANSFERS  / )      HYD08420 C5
      DO 240 K = 1, 10                                                   HYD08480
      KA = K + 5                                                         HYD08490
      LTEMP (KA) = BEGWR ( KN, K )                                       HYD08500
  240 CONTINUE                                                           HYD08510
      IF(KN .EQ. 2)GO TO 239                                                     B
      NODE1=KN                                                                   B
      AQ1VOL=BEGWR(KN,1)                                                         B
      AQ1CHM=BEGWR(KN,10)                                                        B
      GO TO 242                                                                  B
  239 IF(KMONTH .GT. 0)GO TO 241                                                 B
      KMONTH=12                                                                  B
      KYEAR=KYR-1                                                                B
  241 WRITE(7,243)KYEAR,KMONTH,NODE1,AQ1VOL,AQ1CHM,KN,BEGWR(KN,1),BEGWR(         B
     <KN,10)                                                                     B
  243 FORMAT(I5,I3,I2,2F10.1,I5,2F10.1)                                          B
  242 CONTINUE                                                                   B
      TONS = BEGWR ( KN, 10 ) * 1.36E-3                                  HYD08520
      WRITE(IW,245)(LTEMP(K),K=6,15),TONS                                00000059 A
  245 FORMAT(11X,40HAQUIFER CONDITIONS OF LAST TIME FRAME   ,5X,I9,               B
     <8(2X,I4),2X,I5,3X,F6.3)                                                    B
  250 IF ( KS  . LE. NS )  GO TO 160                                     HYD08540
C***** THIS PORTION OF THE SUBROUTINE SETS UP ALL DEMANDS FROM SYSTEM    HYD08550
C*****IN CORRECT OUTPUT MODE                                             HYD08560
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  300 DO 320 K = 1, 10                                                  HYD08570
      NTEMP(K)=KDEMNM(KN,IS,K)
      LTEMP (K) = KDEMNM ( KN, IS, K )                                  HYD08580
  320 CONTINUE                                                          HYD08590
      LTEMP (6) = DEMAND ( KN , IS, 16 )                                HYD08600
  330 DO 340 K = 2, 10                                                  HYD08610
      KA = K + 5                                                        HYD08620
      LTEMP (KA) = CHEMDM ( KN, IS, K )                                 HYD08630
  340 CONTINUE                                                          HYD08640
      TONS = CHEMDM (KN, IS, 10 ) * 1.36 E-3                            HYD08650
C**** THIS IS THE GENERAL OUTPUT STATEMENT FOR MOST OF THE OUTPUT        HYD08660
  400 IF ( MARK .GT. 8 )  GO TO 408                                     HYD08670
      IF ( LTEMP (6) .GT. 0 )  GO TO 408                                HYD08680
      TONS= 0.0                                                         HYD08690
      DO 405 K = 6, 15                                                  HYD08700
      LTEMP (K) = 0                                                     HYD08710
  405 CONTINUE                                                          HYD08720
  408 IF(ISEQ(KN,KS) .NE. 4)GO TO 410                                            B
      IF(QEXCS(KN,1) .EQ. 0.0)GO TO 410                                          B
      DO 411 K=1,10                                                              B
      KA=K+5                                                                     B
  411 LTEMP(KA)=QEXCS(KN,K)                                                      B
      TONS=QEXCS(KN,10)*1.36E-3                                                  B
  410 CONTINUE                                                                   B
      WRITE(IW,409)(NTEMP(K),K=1,10),(LTEMP(J),J=6,15),TONS             HYD08730 A
  409 FORMAT(11X,10A4,5X,I9,8(1X,I5),2X,I5,3X,F6.3)                     HYD08740
      IF ( ISEQ ( KN, KS ) . GT. 0 ) GO TO 490                          HYD08750
      IF ( DEMAND ( KN, IS, 14 ) . GT. 2.0 ) GO TO 490                  HYD08760
      IF(ISEQ(KN,KS) .EQ. -1)GO TO 490                                           B
C**** THIS PORTION OF THE SUBROUTINE COMPUTES AND OUTPUTS THE SHORTAGES HYD08770
C**** FROM THE IDEAL DEMANDS                                            HYD08780
      KTEM = DEMAND ( KN , IS, MO )                                     HYD08790
      LTEMP (17) = KTEM - LTEMP (6)                                     HYD08800
      WRITE ( IW, 420 ) LTEMP (17 )                                     HYD08810
  420 FORMAT ( 11X, 31HSHORTAGE FROM THE IDEAL DEMAND   , 14X, I9  )    HYD08820
      GO TO 490                                                         HYD08830
C**** THIS PORTION OF THE ROUTINE SETS UP ALL INFLOWS TO THE            HYD08840
C**** SYSTEM IN THE CORRECT OUTPUT MODE                                 HYD08850
  450 DO 460 K = 1, 10                                                  HYD08860
      NTEMP (K) = KQINNM ( KN, IS , K )                                 HYD08870
      LTEMP (K) = KQINNM ( KN, IS , K )                                 HYD08870
  460 CONTINUE                                                          HYD08880
      LTEMP (6) = QINFLO ( KN, IS , 1 )                                 HYD08890
      DO 470 K = 2, 10                                                  HYD08900
      KA = K + 5                                                        HYD08910
      LTEMP (KA) = QINFLO ( KN, IS, K )                                 HYD08920
  470 CONTINUE                                                          HYD08930
      TONS = QINFLO ( KN, IS, 10) * 1.36E-3                             HYD08940
      GO TO 400                                                         HYD08950
  490 CONTINUE                                                          HYD08960
C**** BEGIN THE COMPARISON OF OBSERVED AND PREDICTED END OF NODE        HYD08970
C**** FLOWS AND CHEMISTRY                                               HYD08980
  500 WRITE ( IW , 520 )                                                HYD08990
  520 FORMAT ( // 8X, 16HCOMPARISON INDEX    / )                        HYD09000 C5
      DO 530 K = 1, 10                                                  HYD09060
      KA = K + 5                                                        HYD09070

      LTEMP (KA ) = OBSVAL ( KN , K )                                   HYD09080
  530 CONTINUE                                                          HYD09090
      TONS = OBSVAL ( KN, 10 ) * 1.36E-3                                HYD09100
      WRITE(IW,535)(LTEMP(K),K=6,15),TONS                               00000106 A
  535 FORMAT(11X,33HTOTAL OBSERVED OUTFLOWS FROM NODE,12X,I9,8(1X,I5),  HYD09120 B
     <2X,I5,3X,F6.3)                                                             B
      DO 540 K = 1, 10                                                  HYD09170
      KA = K + 5                                                        HYD09180
      LTEMP (KA ) = PREDIC ( KN, K )                                    HYD09190
  540 CONTINUE                                                          HYD09200
      TONS = PREDIC ( KN , 10 ) * 1.36E-3                               HYD09210
      WRITE(IW,545)(LTEMP(K),K=6,15),TONS                               00000112 A
  545 FORMAT(11X,34HTOTAL PREDICTED OUTFLOWS FROM NODE,11X,I9,8(1X,I5), HYD09230 B
     <2X,I5,3X,F6.3)                                                             B
      DO 550 K = 1, 10                                                  HYD09280 C6
      TEMP (K) = OBSVAL (KN, K ) - PREDIC ( KN, K )                     HYD09290
      KA = K+ 5                                                         HYD09300
      LTEMP (KA ) = TEMP (K)                                            HYD09310
  550 CONTINUE                                                          HYD09320
      TONS = TEMP (10) * 1.36E-3                                        HYD09330
      WRITE(IW,555)(LTEMP(K),K=6,15),TONS                               00000119 A
  555 FORMAT(11X,38HSIMPLE DIFFERENCE (OBSERVED-PREDICTED),7X,I9,8(1X,I5HYD09345 B
     <),2X,I5,3X,F6.3)
      WRITE ( IW, 560)                                                  HYD09350
  560 FORMAT ( / 8X, 25HCHEMICAL CHANGES IN NODE  / )                   HYD09360 C2
      DO 570 K = 3, 5                                                   HYD09390
      LTEMP (K) =$CBN23                                                 HYD09400
  570 CONTINUE                                                          HYD09410
      DO 580 K = 1, 10                                                  HYD09420
      TEMP (K) = OBSVAL ( KN, K ) - QINFLO (KN, 1, K )                  HYD09430
      KA = K + 5                                                        HYD09440
      LTEMP (KA) = TEMP (K)                                             HYD09450
  580 CONTINUE                                                          HYD09460
      TONS = TEMP (10) * 1.36E-3                                        HYD09470
      LTEMP (6) = 0                                                     HYD09480
      WRITE(IW,585)(LTEMP(K),K=6,15),TONS                               00000151 A
  585 FORMAT(11X,15HOBSERVED CHANGE,30X,I9,8(1X,I5),2X,I5,3X,F6.3)      HYD09510
      DO 590 K = 1, 10                                                  HYD09520
      TEMP (K) = PREDIC (KN, K ) - QINFLO (KN, 1, K )                   HYD09530
      KA = K + 5                                                        HYD09540
      LTEMP (KA) = TEMP (K)                                             HYD09550
  590 CONTINUE                                                          HYD09560
      LTEMP (6) = 0                                                     HYD09570
      TONS = TEMP (10) * 1.36E-3                                        HYD09580
      WRITE(IW,595)(LTEMP(K),K=6,15),TONS                               00000159
  595 FORMAT(11X,16HPREDICTED CHANGE,29X,I9,8(1X,I5),2X,I5,3X,F6.3)     HYD09595
      IF ( KN . NE. NUMNOD )   GO TO 700                                HYD09600
      WRITE ( IW, 600 )                                                 HYD09610
  600 FORMAT ( / 8X, 26HCHEMICAL CHANGES IN SYSTEM  / )                 HYD09620
      DO 610 K = 1, 10                                                  HYD09650
      TEMP (K) = OBSVAL ( KN, K ) - QINFLO (1, 1, K)                    HYD09660
      KA = K + 5                                                        HYD09670
      LTEMP (KA ) = TEMP (K)                                            HYD09680
  610 CONTINUE                                                          HYD09690
      KKOUNT=KKOUNT+1                                                            B
      CYO(KKOUNT)=OBSVAL(KN,10)                                                  B
```

```
                                                                                       B
      CYP(KKOUNT)=PREDIC(KN,10)                                                        B
      TX(KKOUNT)=KKOUNT                                                      HYD09700
      LTEMP (6) = 0                                                          HYD09710
      TONS = TEMP (10 ) * 1.36E-3                                            
      WRITE(IW,585)(LTEMP(K),K=6,15),TONS                                    A
      DO 620 K = 1, 10                                                       HYD09750 C2
      TEMP (K) = PREDIC (KN, K ) - QINFLO (1, 1, K )                         HYD09760
      KA = K + 5                                                             HYD09770
      LTEMP (KA) = TEMP (K)                                                  HYD09780
  620 CONTINUE                                                               HYD09790
      LTEMP (6) = 0                                                          HYD09800
      TONS = TEMP (10 ) * 1.36E-3                                            HYD09810
      WRITE(IW,595)(LTEMP(K),K=6,15),TONS                                    
  700 CONTINUE                                                               HYD09830
 2000 RETURN                                                                 
      END                                                                    HYD09850

MEMORY REQUIREMENTS 001964 BYTES

HIGHEST SEVERITY CODE WAS  0

                                                                                  C711
      FUNCTION NFIND (NODE)
      COMMON / GENRL / LTITLE(16),NCTRL( 5, 3), MOBEG, IYRBEG, MOEND, IHYD15970
     AYREND, NUMNOD, ISEQ( 5, 20), KPRT, NUMSEQ( 5), NOWTR( 5, 20)      HYD15980
C***** SUBROUTINE FINDS SUBSCRIPT NUMBER FOR NODE PASSED THROUGH ARGUMENTHYD15990
C***** LIST                                                             HYD16000
      IW=6                                                                 A
      DO 5 J = 1, NUMNOD                                                HYD16020
      JK = J                                                            HYD16030
      IF (NODE.EQ.NCTRL(J, 1)) GO TO 10                                 HYD16040
    5 CONTINUE                                                          HYD16050
      GO TO 15                                                          HYD16060
   10 NFIND = JK                                                        HYD16070
      RETURN                                                            HYD16080
C***** ERROR MESSAGES FOR PROGRAM CONTROLLED ERRORS ARE GENERATED HERE  HYD16090
   15 WRITE (IW, 20) NODE                                               HYD16100 C1
      CALL EXIT                                                         HYD16120
   20 FORMAT (1H1, 44HNO MATCH WAS FOUND IN CONNOD FOR NODE NUMBER, I5)HYD16130
      END                                                               HYD16140

MEMORY REQUIREMENTS 000270 BYTES

HIGHEST SEVERITY CODE WAS  0

      SUBROUTINE RECOMP ( QFLOW, NK, IP, INDY, MO, CONST, IW )
      COMMON / RESER /                                                     A
     A QINFLO(5,10,12),DEMAND(5,10,16),K                                HYD00100
     BDEMNM( 5, 10,16), KQINNM( 5, 10,16) , KAQUNM (5,16)               HYD16190
      COMMON / PROPER / SOIL( 5, 10, 21), BTANK( 5, 10), TTANK( 5, 10),HYD16200
     1 GRTANK (5, 10)  , NSEG ( 5) , CONUSE ( 5, 10, 30)
      DIMENSION KUSE(5,10,30)
      INTEGER $SUR/'SUR '/.$GWR/'GWR '/.$IRR/'IRR '/.$MAI/'MAI '/         A
                                                                        HYD16210 B
      INTEGER $GWV/'GWV'/                                               HYD16220
      EQUIVALENCE ( CONUSE, KUSE )                                      HYD16230
      DIMENSION QFLOW (10), RFLOW (10)                                  HYD16240
C***** THIS SUBROUTINE COMPUTES MAGNITUDE, CHEMISTRY AND THE ALLOCATION HYD16250
C***** OF RETURN FLOWS. ALSO THE SUBROUTINE COMPUTES SHORTAGES AND      HYD16260
C***** COMPARES THESE WITH THE SHORTAGE INDICES. EXCHANGES BETWEEN      HYD16270
C***** SURFACE FLOWS , SUBSURFACE FLOWS, AND THE SOIL COLUMNS ARE       HYD16280
C***** SIMULATED AS DEMANDS WITHOUT RETURN FLOW ALLOCATIONS.  THERE ARE HYD16290
C***** ONLY TWO DEMANDS WITH RETURN FLOW ALLOCATIONS AND THOSE ARE FOR  HYD16300
C***** IRRIGATION AND MUNICIPAL AND INDUSTRIAL REQUIREMENTS. DEMANDS    HYD16310
C***** ARE THOSE CONSIDERED IDEAL OR FULL SUPPLY COMPUTED AT THE        HYD16320
C***** POINT OF DIVERSION AND INCLUDE CONVEYANCE LOSSES AND FARM LOSSES HYD16330
C***** CONSUMPTIVE USE VALUES REPRESENT A LUMPED BENEFICIAL AND NON     HYD16340
C***** BENEFICIAL REQUIREMENT.     QFLOW = VOLUME AND CHEMISTRY OF      HYD16350
C***** SOURCE, NK AND IP ARE THE NODE AND SEQUENCE INDICES RESPECTIVELY HYD16360
C***** INDY = USE INDEX , MO = MONTH AND IW = WRITE UNIT.                  B
      DO 70 K=1,10                                                         B
   70 RFLOW(K)=0.0                                                      HYD16370
      IF ( INDY .GT. 5 )  GO TO 1010                                    HYD16380
      GO TO ( 80, 200, 300, 300, 300) , INDY                            HYD16390
C***** DEMAND HAS BEEN MET SET SHORTAGE ( PERCENT ) EQUAL TO ZERO       HYD16400
   80 CONUSE ( NK, IP, 15 ) = 0.0                                       HYD16410
C***** BEGIN TO COMPUTE RETURN FLOW ITS ALLOCATION AND CHEMISTRY        HYD16420
      RFLOW (1) = CONST - CONUSE (NK, IP, MO )                          HYD16424 C2
      IF(RFLOW(1) .LE. 0.0)RFLOW(1)=0.0                                 HYD16425 B
      IF(RFLOW(1) .LE. 0.0)GO TO 110                                    HYD16430
   90 VOLA = CONST                                                      HYD16440
      VOLB = RFLOW (1)                                                  HYD16450
      DO 100 K = 2, 10                                                  HYD16460
      RFLOW (K) = QFLOW (K) * ( VOLA / VOLB )                           HYD16470
  100 CONTINUE                                                          HYD16480 A
  110 K=15                                                              HYD16490
  120 K = K + 4                                                         HYD16500
      IF ( K . GT. 27 )  GO TO 2000                                     HYD16510
      KDES = KUSE ( NK, IP, K)                                          HYD16520
      KNODE = KUSE (NK, IP, K + 1 )                                     HYD16530
      IF ( KNODE . LE. 0 )  GO TO 120                                   HYD16540
      KSEQ = KUSE ( NK, IP, K + 2 )                                     HYD16550
      KPER = KUSE ( NK, IP, K + 3 )                                     HYD16560
      JK = NFIND (KNODE )                                               HYD16570
      PER = KPER                                                        HYD16580
      QINFLO ( JK, KSEQ, 1 ) = RFLOW (1) * PER * 1.0E-2                 HYD16590
      DO 130 KA = 2, 10                                                 HYD16600
      QINFLO ( JK, KSEQ, KA ) = RFLOW (KA)                              HYD16610
  130 CONTINUE                                                          HYD16620
      IF ( KDES . EQ.  $SUR ) QINFLO( JK, KSEQ, 11 ) = 1.0              HYD16630
      IF ( KDES . EQ.  $GWR ) QINFLO( JK, KSEQ, 11 ) = 2.0              HYD16640
      IF ( KDES . EQ.  $GWV ) QINFLO( JK, KSEQ, 11 ) = 3.0              HYD16650
C***** SET ALPHA INDICATOR TO SHOW RETURN FLOW IS EITHER FROM           HYD16660
C***** IRRIGATION OR A MUNICIPAL AND INDUSTRIAL USE                     HYD16670
      IF ( DEMAND ( NK, IP, 14) . EQ. 1.0 )  KUSE ( NK, IP, 17 ) =  $IRRHYD16680
      IF ( DEMAND ( NK, IP, 14) . EQ. 2.0 )  KUSE ( NK, IP, 17 ) =  $MAIHYD16690
      GO TO 120                                                         HYD16700
C***** DEMAND HAS NOT BEEN MET COMPUTE SHORTAGE IN PERCENT              HYD16710
  200 RATIO = CONUSE ( NK, IP, 13 ) * 1.0E-2                            HYD16720
      TEMCU = CONST * ( 1.0 - RATIO )
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      SHORT = ( 1.0 - ( TEMCU / CONUSE (NK, IP, MO))) * 1.0E2                   HYD16730
C**** COMPARE SHORTAGE WITH SHORTAGE INDEX                                      HYD16740
      IF ( SHORT . GT. CONUSE ( NK, IP, 14 )) GO TO 1000                        HYD16750
C**** SHORTAGE IS LESS THAN SHORTAGE INDEX COMPUTE RETURN FLOW                  HYD16760
      RFLOW (1) = CONST - TEMCU                                                 HYD16770
      CONUSE ( NK, IP, 15) = SHORT                                              HYD16780
      GO TO 90                                                                  HYD16790
C**** WHEN THE INDEX ( INDY ) IS GREATER THAN 2 THE ROUTINE TREATS              HYD16800
C**** THE DEMANDS AS TRANSFERS OF FLOW WITHOUT RETURN FLOW OR                   HYD16810
C**** CONSUMPTIVE USE                                                           HYD16820
  300 KDES = KUSE (NK, IP, 19)                                                  HYD16830
      KNODE = KUSE (NK, IP, 20)                                                 HYD16840
      KSEQ = KUSE ( NK, IP, 21 )                                                HYD16850
      JP = NFIND ( KNODE)                                                       HYD16860
      IF ( CONST . GT. 0.0 )  GO TO 315                                         HYD16870
      DO 310  K = 1, 10                                                         HYD16880
      QINFLO( JP, KSEQ, K ) = 0.0                                               HYD16890
  310 CONTINUE                                                                  HYD16900
      GO TO 330                                                                 HYD16910
  315 QINFLO( JP, KSEQ, 1 ) = CONST                                             HYD16920
      DO 320 K = 2, 10                                                          HYD16930
      QINFLO ( JP, KSEQ, K ) = QFLOW (K)                                        HYD16940
  320 CONTINUE                                                                  HYD16950
  330 IF ( KDES . EQ.  $SUR ) QINFLO( JK, KSEQ, 11 ) = 1.0                      HYD16960
      IF ( KDES . EQ.  $GWR ) QINFLO( JK, KSEQ, 11 ) = 2.0                      HYD16970
      IF ( KDES . EQ.  $GWV ) QINFLO( JK, KSEQ, 11 ) = 3.0                      HYD16980
      GO TO 2000                                                                HYD16990
 1000 WRITE ( IW, 1005)  (KDEMNM ( NK, IP, K) , K= 1, 8), NK, IP                HYD17000
 1005 FORMAT ( 1H1, 7X, 32HSHORTAGE INDEX IS VIOLATED FOR      , 8A8 /          HYD17010
     1        13HFOR NODE NO.    , I3, 5X, 12HSEGMENT NO.      , I3 )           HYD17020
      CALL EXIT                                                                 HYD17030
 1010 WRITE ( IW, 1015 ) INDY , NK, IP                                          HYD17040
 1015 FORMAT ( 1H1, 7HINDY =    , I3, 5X, 24HWHICH IS GREATER THAN 5            HYD17050
     1        13HFOR NODE NO.   , I3, 5X, 12HSEGMENT NO.   , I3 )               HYD17060
      CALL EXIT                                                                 HYD17070
 2000 RETURN                                                                    HYD17080
      END                                                                       HYD17090

MEMORY REQUIREMENTS 000AFC BYTES

HIGHEST SEVERITY CODE WAS  0

      SUBROUTINE  CHEMGR ( QFLOW , CONST , KN, KS )
      COMMON / RESER /
     A QINFLO(5,10,12),DEMAND(5,10,16),K
     BDEMNM( 5, 10,16), KQINNM( 5, 10,16) , KAQUNM (5,16)                         A
      COMMON / PROPER / SOIL( 5, 10, 21), BTANK( 5, 10), TTANK( 5, 10),HYD00100
     1 GRTANK( 5, 10)  , NSEG ( 5) , CONUSE ( 5, 10, 30)                        HYD17140
      DIMENSION KUSE(5,10,30)                                                   HYD17150
      EQUIVALENCE ( CONUSE, KUSE )
      DIMENSION QFLOW(10),QINRIV(10),TEMP(10)                                   HYD17170
C**** THIS SUBROUTINE IS USED TO COMPUTE A LINEAR MIX OF CHEMISTRY              HYD17180 A
C**** FOR FLOW ADDED TO THE RIVER ( SURFACE) , TO THE AQUIFER (SUBSURFACHYD17190
C**** , TO THE PONDING POOL ABOVE SOIL COLUMN, AND FLOW ADDED TO THE            HYD17200
C**** RESERVOIR.                                                                HYD17210
C**** QFLOW = FLOW IN RIVER ARRAY , KN AND KS ARE INDICES FOR NODE AND          HYD17220
C**** SEQUENCE RESPECTIVELY, CONST = DEMAND OR DIVERSION                        HYD17230
C**** THIS ENTRY MIXES RIVER FLOW WITH AQUIFER                                  HYD17240
      KAT=1                                                                     HYD17250
      VOLA = CONST                                                                B
      VOLB = GRTANK (KN, 1 )                                                    HYD17260
      VOLUME = VOLA + VOLB                                                      HYD17270
      IF (VOLUME.LE.0.0) GO TO 2001                                             HYD17280
      DO 50 K = 2, 10                                                             B
      GRTANK (KN, K ) = ( QFLOW (K) * VOLA + GRTANK (KN, K ) * VOLB )           HYD17290
     1                / VOLUME                                                  HYD17300
   50 CONTINUE                                                                  HYD17310
      GO TO 2000                                                                HYD17320
C**** THIS ENTRY MIXES RIVER FLOW WITH PONDING POOL                             HYD17330
      ENTRY CHEMTT(QFLOW,CONST,KN,KS)                                           HYD17340
      KAT=2                                                                     HYD17350
      VOLA = CONST                                                                B
      VOLB = TTANK (KN, 1 )                                                     HYD17360
      VOLUME = VOLA + VOLB                                                      HYD17370
      IF (VOLUME.LE.0.0) GO TO 2001                                             HYD17380
      DO 60 K = 2, 10                                                             B
      TTANK (KN, K ) = ( QFLOW (K) * VOLA + TTANK (KN, K ) * VOLB )             HYD17390
     1                / VOLUME                                                  HYD17400
   60 CONTINUE                                                                  HYD17410
      GO TO 2000                                                                HYD17420
C*** THIS ENTRY MIXES FLOW TO RIVER WITH RIVER                                  HYD17430
      ENTRY CHEMRV(QINRIV,CONST,KN,KS)                                          HYD17440
      KAT=3                                                                     HYD17450
      VOLA = QINFLO( KN, KS, 1 )                                                  B
      VOLB=QINRIV(1)                                                            HYD17460
      VOLUME = VOLA + VOLB                                                      HYD17470 A
      IF (VOLUME.LE.0.0) GO TO 2001                                             HYD17480
      DO 70 K = 2, 10                                                             B
      QINRIV(K)=(QINFLO(KN,KS,K)*VOLA+QINRIV(K)*VOLB)/VOLUME                    HYD17490
   70 CONTINUE                                                                  HYD17500 A
      GO TO 2000                                                                HYD17510
C**** THIS ENTRY MIXES AQUIFER FLOW WITH RIVER FLOW                             HYD17520
      ENTRY CHEMAQ(QFLOW,CONST,KN,KS)                                           HYD17760
      KAT=4                                                                     HYD17770
      VOLA = QFLOW (1)                                                            B
      VOLB = GRTANK (KN, 1 )                                                    HYD17780
      VOLUME = VOLA + VOLB                                                      HYD17790
      IF (VOLUME.LE.0.0) GO TO 2001                                             HYD17800
      DO 130 K = 2, 9                                                             B
      QFLOW (K) = ( QFLOW (K) * VOLA + GRTANK ( KN, K ) * VOLB)/ VOLUME HYD17810
  130 CONTINUE                                                                  HYD17820
      GO TO 2000                                                                HYD17830
C**** THIS ENTRY MIXES BTANK WATER WITH AQUIFER                                 HYD17840
      ENTRY CHEMBT(QFLOW,CONST,KN,KS)                                           HYD17850
      KAT=5                                                                     HYD17860
      VOLA = QFLOW (1)                                                            B
      VOLB = GRTANK (KN, 1)                                                     HYD17870
      VOLUME = VOLA + VOLB                                                      HYD17880
      IF (VOLUME.LE.0.0) GO TO 2001                                             HYD17890
                                                                                  B
      DO 140 K = 2, 10                                                  HYD17900
      GRTANK (KN, K) = ( QFLOW (K) * VOLA + GRTANK (KN,K) * VOLB ) /    HYD17910
     1        VOLUME                                                    HYD17920
  140 CONTINUE                                                          HYD17930
      GRTANK (KN, 1 ) = VOLUME                                          HYD17940
      GO TO 2000                                                                 B
 2001 WRITE( 6,2002)KN,KS,KAT                                                    B
 2002 FORMAT(5X,'VOLUME LESS THAN OR EQUAL TO ZERO FOR NODE ',I5,2X,             B
     1'SEQUENCE EQUAL TO ',I5,2X,'KAT = ',I2/)                                   B
 2000 RETURN                                                            HYD17950
      END                                                               HYD17960

MEMORY REQUIREMENTS 000A00 BYTES

HIGHEST SEVERITY CODE WAS  0

      SUBROUTINE CONVER ( TEMP , KR ,IW)                                         A
C**** THIS SUBROUTINE IS USED TO CONVERT INPUT UNITS TO PPM AND          HYD17980
C**** ALSO TO CHECK BALANCE BETWEEN CATIONS AND ANIONS                   HYD17990
      DIMENSION TEMP (15) , EQVWT (8)                                   HYD18000
      DATA EQVWT / 20.04,12.16,23.0,35.46,48.03,61.01,30.0,62.008/      HYD18010
      IF ( KR . NE. 1 )  GO TO 80                                       HYD18030
C**** UNITS ARE IN MILLIEQUIVALENTS PER LITER  CHECK SUM OF CATIONS      HYD18040
C**** AND ANIONS                                                        HYD18050
C**** SUM CATIONS                                                       HYD18060
   10 SUMC = 0.0                                                        HYD18070
      DO 20 K = 2, 4                                                    HYD18080
      SUMC = SUMC + TEMP (K)                                            HYD18090
   20 CONTINUE                                                          HYD18100
C**** SUM ANIONS                                                        HYD18110
      SUMA = 0.0                                                        HYD18120
      DO 30 K = 5,9                                                     HYD18130
      SUMA = SUMA + TEMP (K)                                            HYD18140
   30 CONTINUE                                                          HYD18150
      DIFF = SUMC - SUMA                                                HYD18160
      IF ( DIFF . GT. 0.0 )   GO TO 40                                  HYD18170
      TEMP (2) = TEMP (2) + ABS ( DIFF )                                HYD18180
      GO TO 45                                                          HYD18190
   40 TEMP (6) = TEMP(6) + DIFF                                         HYD18200
C**** CONVERT FROM MILLIEQUIVALENTS PER LITER TO PARTS PER MILLION      HYD18210
   45 DO 50 K = 2, 9                                                    HYD18220
      KA = K - 1                                                        HYD18230
      TEMP (K) = TEMP (K) * EQVWT ( KA )                                HYD18240
   50 CONTINUE                                                          HYD18250
C**** COMPUTE TOTAL DISSOLVED SOLIDS FROM ANALYSIS                      HYD18260
      TDS = 0.0                                                         HYD18270
      DO 70 K = 2, 9                                                    HYD18280
      IF ( K . EQ. 7 )  GO TO 60                                        HYD18290
      TDS = TDS + TEMP (K)                                              HYD18300
      GO TO 70                                                          HYD18310
   60 TDS = TDS + ( TEMP (K) * 5.0E-1 )                                 HYD18320
   70 CONTINUE                                                          HYD18330
      TEMP (10 ) = TDS                                                  HYD18340
      WRITE ( IW, 75) ( TEMP (K) , K = 1, 10 )                          HYD18350 A
   75 FORMAT ( 8X, 10 ( 2X, F10.2 ))                                    HYD18360
      GO TO 2000                                                        HYD18370
C**** CONVERT PARTS PER MILLION TO MILLIEQUIVALENTS PER LITER           HYD18380
   80 DO 85 K = 2, 9                                                    HYD18390
      KA = K- 1                                                         HYD18400
      TEMP (K) = TEMP (K) / EQVWT (KA)                                  HYD18410
   85 CONTINUE                                                          HYD18420
      GO TO 10                                                          HYD18430
 2000 RETURN                                                            HYD18440
      END                                                               HYD18450

MEMORY REQUIREMENTS 000484 BYTES

HIGHEST SEVERITY CODE WAS  0

      SUBROUTINE VERNAL (KN,IS,MO,OBSERV,QFLOW)
C**** THIS SUBROUTINE SIMULATES THE ASSUMED CRITERIA FOR EACH NODE      HYD18470
C**** IN OBTAINING A HYDROLOGIC BALANCE WITH SIMPLE TRANSFERS FROM      HYD18480
C**** SURFACE TO SUBSURFACE OR THE CONVERSE. THE ARGUMENT LIST IS       HYD18490
C**** AS FOLLOWS - KN AND IS ARE THE NODE AND SEQUENCE INDICES          HYD18500
C**** RESPECTIVELY. OBSEVR IS THE ARRAY CONTAINING THE OBSERVED OUTFLOWSHYD18510
C**** QFLOW IS THE ARRAY CONTAINING THE RIVER VOLUME AND CHEMISTRY      HYD18520
      COMMON / RESER /
     A QINFLO(5,10,12),DEMAND(5,10,16),K                                         A
     BDEMNM( 5, 10,16), KQINNM( 5, 10,16) , KAQUNM (5,16)               HYD00100
      DIMENSION OBSERV (10) , QFLOW (10)                                HYD18560
      GO TO (50,70),KN                                                  HYD18570
C**** THESE ARE THE TRANSFER PARAMETERS FOR NODE 101                    HYD18580
C
C     MIN IS THE SEQUENCE NUMBER OF THE 1ST OBSERVED OUTFLOW
C     MAX IS THE SEQUENCE NUMBER OF THE LAST OBSERVED OUTFLOW
C     KA IS THE SEQUENCE NUMBER OF THE "TRANSFER OF FLOW FROM AQUIFER
C     TO RIVER" CARD
C
C     CARD #HYD18751 IS INCLUDED FOR NODE 2 BECAUSE MIN=MAX FOR THIS
C     CASE(IE, THERE WAS ONLY ONE OBSERVED OUTFLOW IN NODE 2)
C
   50 MIN=5                                                             HYD18590 A
      MAX=7                                                             HYD18600 A
      KA=5                                                              HYD18610 A
      GO TO 110                                                         HYD18620
C**** THESE ARE THE TRANSFER PARAMETERS FOR NODE 102                    HYD18630
   70 MIN=5                                                             HYD18640 A
      MAX=5                                                             HYD18650 A
      KA=5                                                              HYD18660 A
  110 IF ( IS .GT. MIN )   GO TO 150                                    HYD18720 C4
      DO 130 K = 1, 10                                                  HYD18730
      OBSERV (K) = QINFLO ( KN, IS, K)                                  HYD18740
  130 CONTINUE                                                          HYD18750
      IF(KN .EQ. 2)GO TO 181                                            00018751 B
      GO TO 2000                                                        HYD18760
  150 VOLA = OBSERV (1)                                                 HYD18770
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      VOLB = DINFLO (KN, IS, 1)                                         HYD18780
      VOLUME = VOLA + VOLB                                              HYD18790
      IF(VOLUME.LE.0.0) GO TO 180                                               B
      DO 170 K = 2, 10                                                  HYD18800
      OBSERV (K) = ( OBSERV (K) * VOLA + DINFLO (KN, IS, K ) * VOLB ) / HYD18810
     1       VOLUME                                                     HYD18820
  170 CONTINUE                                                          HYD18830
  180 OBSERV(1)=VOLUME                                                          A
      IF ( IS.LT. MAX )   GO TO 2000                                    HYD18850
  181 KB = KA-1                                                         HYD18860 A
      DIFF = OBSERV (1) - OFLOW (1)                                     HYD18870
      IF ( DIFF . LT. 0.0 ) GO TO 190                                   HYD18880
C**** VOLUME OF OBSERVED OUTFLOW IS GREATER THAN THE PREDICTED OUTFLOW  HYD18890
C**** SET UP TRANSFER OF RIVER FLOW TO THE AQUIFER                      HYD18900
      DEMAND ( KN, KA, MO ) = DIFF                                      HYD18910
      DEMAND ( KN, KB, MO ) = 0.0                                       HYD18920
      GO TO 2000                                                        HYD18930
C**** VOLUME OF OBSERVED OUTFLOW IS LESS THAN THE PREDICTED OUTFLOW     HYD18940
C**** SET UP TRANSFER FROM THE AQUIFER TO THE RIVER                     HYD18950
  190 DEMAND ( KN, KA, MO ) = 0.0                                       HYD18960
      DEMAND (KN, KB, MO ) = ABS (DIFF)                                 HYD18970
 2000 RETURN                                                            HYD18980
      END                                                               HYD18990

MEMORY REQUIREMENTS 0004F0 BYTES

HIGHEST SEVERITY CODE WAS  0


      FUNCTION ROOTWO ( KNODE , KSEG , CA , MOLE , IW )
CALCULATE ROOT OF (X) USING QUADRATIC WHERE                             HYD19010
C**** X = ( - B + SQRT ( B*B - 4 * A * C ) / 2 A     KNODE = NODE       HYD19020
C**** INDEX AND KSEG = SEGMENT INDEX  CA = ARRAY OF COEFFICIENTS         HYD19030
C**** IN DECREASING POWERS OF (X)   MOLE = ALPHA DEFINITION OF (X)      HYD19040
      DIMENSION CA (10)                                                 HYD19050
      RAD = CA (2) * CA (2) - ( 4.0 * CA (1) * CA (3) )                 HYD19060
      IF ( RAD . LE. 0.0 ) GO TO 1000                                   HYD19070
      ROOTWO = ( - CA (2) + SQRT ( RAD )) /(2.0 * CA (1))               HYD19080
C  40 WRITE ( IW , 50 ) MOLE , CA(1) , CA(2) , CA(3) , RAD , ROOTWO     HYD19090
C  50 FORMAT ( 1H1, 8X, R6, 2X,                                         HYD19100
C    1           9HCA (1) = , F15.8, 2X,                                HYD19110
C    1           9HCA (2) = , F15.8, 2X,                                HYD19120
C    1           9HCA (3) = , F15.8, 2X,                                HYD19130
C    1           9HRADCAL = , F15.8 / 2X,                               HYD19140
C    1           9HROOTWO = , F15.8 )                                   HYD19150
      GO TO 2000                                                        HYD19160
 1000 WRITE ( IW , 1005 ) KNODE , KSEG , MOLE                           HYD19170
 1005 FORMAT(1H1, 8X, 25HPROBABLY NOT A REAL ROOT   , 5X, 11HSET ROOT TO HYD19180
     1       5H ZERO  , 5X, 7HNODE =   , I3 , 5X, 6HSEG =  , I3, 5X,    HYD19190
     2       4HFOR   , A6, 2X, 11HCOMPUTATION  )                        HYD19200
 2000 RETURN                                                            HYD19210
      END                                                               HYD19220
MEMORY REQUIREMENTS 000300 BYTES

HIGHEST SEVERITY CODE WAS  0


      FUNCTION ROOT (CONST, XMAX, XMIN , MOLE , CA, TESTA )
C**** THIS FUNCTION WILL COMPUTE THE REAL ROOT IF ONE EXISTS            HYD19240
C**** IN THE RANGE XMIN - XMAX INCLUSIVE. IF A ROOT EXISTS IN THIS RANGEHYD19250
C**** MOLE WILL BE SET = TRUE. IF NO ROOT EXISTS , MOLE WILL BE SET =   HYD19260
C**** FALSE. F (X) = CONST AND COEFFICIENTS CA (1) )) CA (N+1 ) ARE     HYD19270
C**** TRANSFERRED THROUGH ARGUMENT LIST IN INCREASING POWERS OF THE     HYD19280
C**** INDEPENDENT VARIABLE.  IN THE FUNCTION FOFX NK = 5 , SO IF  A     HYD19290
C**** A HIGHER THAN FOURTH DEGREE POLYNOMIAL IS TO SOLVED RESET NK      HYD19300
C**** IF NO ROOT IS FOUND AFTER TWENTY ITERATIONS NO ROOT WILL BE       HYD19310
C**** CONSIDERED AND MOLE WILL BE SET = NONE.                           HYD19320
      DIMENSION  CA(10)                                                 HYD19330
      INTEGER  $SC4/'FALS'/,$SC6/'NONE'/,$SC7/'TRUE'/                           B
      XA = 1.E-1 * XMAX                                                 HYD19340
      IF ( XMIN . LT. 0.0 ) XA = 1.E-1 * XMIN                           HYD19350
      XB = XA + XA                                                      HYD19360
      IW=6                                                                      A
C     WRITE ( IW , 5 ) XMAX , XMIN , MOLE                               HYD19380
C   5 FORMAT ( 1H1, 8X, 7HXMAX =   , F15.8, 5X, 7HXMIN = , F15.8 , 5X,  HYD19390
C    1         4HFOR   , R6 // )                                        HYD19400
      DO 15 K= 1, 5                                                     HYD19410
C     WRITE ( IW , 10 )  K , CA (K)                                     HYD19420
C  10 FORMAT ( 8X, 4HCA(   , I2 , 5H ) = , F20.8 // )                   HYD19430
   15 CONTINUE                                                          HYD19440
C     WRITE ( IW , 18 )                                                 HYD19450
C  18 FORMAT ( 10X, 2HXA , 18X, 3HFXA , 18X, 2HXB , 18X, 3HFXB , 18X,   HYD19460
C    1         2HXC , 16X, 5HCONST  / )                                 HYD19470
      MOLE = $SC7                                                       HYD19480
      NK = 0                                                            HYD19490
      CA(1) = CA(1) - CONST                                             HYD19500
      FXA = FOFX ( CA , XA, 1 )                                         HYD19510
      GO TO 30                                                          HYD19520
   20 FXA = FXB                                                         HYD19530
   30 NK = NK + 1                                                       HYD19540
      IF(NK.GT.20)  GO TO 100                                           HYD19550
      FXB = FOFX ( CA, XB, 1 )                                          HYD19560
      DX = XB - XA                                                      HYD19570
      DXDP = FXB - FXA                                                  HYD19580
      IF(DXDP.EQ.0.0)  GO TO 50                                         HYD19590
      XC = XB - DX * FXB / DXDP                                         HYD19600
C     WRITE(61,  40) XA, FXA, XB, FXB, XC, CONST                        HYD19610
C  40 FORMAT (  6E20.10  )                                              HYD19620
      EPSLON =  ABS (XC - XB)                                           HYD19630
      IF ( ABS (EPSLON) . LT.TESTA  )  GO TO 50                         HYD19640
      XA = XB                                                           HYD19650
      XB = XC                                                           HYD19660
      GO TO 20                                                          HYD19670
   50 ROOT = XB                                                         HYD19680
      IF(XB.GT.XMAX.OR.XB.LT.XMIN) MOLE = $SC4                          HYD19690
      GO TO 2000                                                        HYD19700
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        100 ROOT = 0.0                                                        HYD19710
             MOLE = $SC6                                                      HYD19720
       2000 RETURN                                                            HYD19730
             END                                                              HYD19740

MEMORY REQUIREMENTS 00043C BYTES

HIGHEST SEVERITY CODE WAS  0

             FUNCTION FOFX(CF,X, KAM )
      C**** THIS FUNCTION EVALUATES ANY POLYNOMIAL  FROM 1ST DEGREE TO        HYD19760
      C**** FOURTH DEGREE INCLUSIVE ( SEE SETTING OF NK ) IF A HIGHER DEGREE  HYD19770
      C**** POLYNOMIAL IS TO BE EVALUATED RESET NK  WHERE NK - 1 = DEGREE     HYD19780
             DIMENSION  CF(10)                                                HYD19790
             FOFX = 0.0                                                       HYD19800
             NK = 5                                                           HYD19810
         30  FOFX = FOFX + CF(NK)                                             HYD19820
             FOFX = FOFX * X                                                  HYD19830
             NK = NK - 1                                                      HYD19840
             IF(NK.GT.1)  GO TO 30                                            HYD19850
             FOFX = FOFX + CF(1)                                              HYD19860
             IF ( KAM . NE. 0 ) GO TO 2000                                    HYD19870
             DO 40 K = 1, 10                                                  HYD19880
             CF (K) = 0.0                                                     HYD19890
         40  CONTINUE                                                         HYD19900
       2000  RETURN                                                           HYD19910
             END                                                              HYD19920

MEMORY REQUIREMENTS 000278 BYTES

HIGHEST SEVERITY CODE WAS  0

             SUBROUTINE SOILCO ( KNODE , IW , IR , NSEGS)
      C****                                                                   HYD19940
      C**** THIS SUBROUTINE IS USED AS A MONITOR SUBROUTINE FOR ALL SUB-      HYD19950
      C**** ROUTINES USED IN THE SIMULATION OF PERCOLATING APPLIED WATERS     HYD19960
      C**** VERTICALLY THROUGH A SOIL COLUMN USING PISTON DISPLACEMENT OF     HYD19970
      C**** SOLUTION FROM SEGMENT TO SEGMENT. THE FIRST STEP IS TO CHECK      HYD19980
      C**** FOR FIRST CALL TO THIS SUBROUTINE -- IF FIRST CALL CLEAR ARRAY    HYD19990
      C**** ITER WHERE TALLY IS KEPT FOR NUMBER OF TIMES SEGMENT HAS BEEN     HYD20000
      C**** EQUILIBRATED FOR EACH APPLICATION OF WATERS TO BE PERCOLATED      HYD20010
      C**** AND ALSO ARRAY KWATER WHERE TALLY IS KEPT OF EACH APPLICATION     HYD20020
      C**** OF NEW WATER.                                                     HYD20030
             COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,  HYD20040
           1                  SLNO3 ,UCASO4 , UMGSO4                          HYD20050
             COMMON /SOLID/ CATEX, GYPSUM, SLIME ,BDENS, EXCA ,EXNA, EXMG ,   HYD20060
           1                EXTRAC , DEPTH, SEGVOL , INTER                    HYD20070
             DIMENSION ITER (20, 10 ) , KWATER (20) , CA (10)                 HYD20080
             DATA    IFIR / 0 /                                               HYD20090
             IF ( IFIR .NE. 0 ) GO TO 25                                      HYD20100
             DO 20 K = 1, 20                                                  HYD20110
             KWATER (K) = 0                                                   HYD20120

         20  CONTINUE                                                         HYD20130
             IFIR = 1                                                         HYD20140
         25  DO 30 I = 1, 20                                                  HYD20150
             DO 30 J = 1, 10                                                  HYD20160
             ITER ( I, J) = 0                                                 HYD20170
         30  CONTINUE                                                         HYD20180
             IF ( KWATER (KNODE ) . GT. 0 )  GO TO 300                        HYD20190
             ISW = 0                                                          HYD20200
             MAX = NSEGS                                                      HYD20210
             MIN = 1                                                          HYD20220
      C**** BEGIN EQUILIBRATION OF ALL SEGMENTS IN SOIL COLUMN FOR A          HYD20230
      C**** A PARTICULAR ITERATION INDEX                                      HYD20240
         35  DO 200 K = MIN , MAX                                             HYD20250
             NCT = 0                                                          HYD20260
      C**** UPDATE COUNTER (ITER) WHICH INDICATES NUMBER OF TIMES THE         HYD20270
      C**** KTH SEGMENT HAS BEEN EQUILIBRATED                                 HYD20280
             ITER (KNODE , K ) = ITER ( KNODE , K ) + 1                       HYD20290
      C**** PLACE DATA FROM SOIL ARRAY INTO COMPUTATIONAL VARIABLE            HYD20300
      C**** NAME SEQUENCE FOR THE KTH SEGMENT                                 HYD20310
             CALL SETUP ( KNODE , K , NSEGS, ISW )                            HYD20320
      C      WRITE ( IW , 40) ITER ( KNODE , K ) , KNODE , K                  HYD20330
      C  40  FORMAT ( 1H1, 7X,41HBEGINNING CONDITIONS-EQUILIBRATION NO. = ,I2/ HYD20340
      C    1               8X, 11HFOR NODE = , I3, 5X,10HSEGMENT =  , I2/ )   HYD20350
      C      CALL SCRIBE (IW)                                                 HYD20360
      CALCULATE MOISTURE CONTENT (WRATIO) = GRAMS OF WATER / GRAMS OF SOIL    HYD20370
      C**** FOR THE INITIAL SOIL ANALYSIS WRATIO = EXTRACT (EXTRAC) , MOISTUREHYD20380
      C**** CONTENT FOR APPLIED WATERS IS A FUNCTION OF VOLUME OF WATER,      HYD20390
      C**** BULK DENSITY AND DEPTH OF KTH SEGMENT                             HYD20400
      C**** MOISTURE CONTENT IN PERCENT (PRATIO) = WRATIO * 1.E2              HYD20410
             WRATIO = EXTRAC                                                  HYD20420
             IF ( KWATER (KNODE) . GT. 0 ) WRATIO = SEGVOL / ( BDENS * DEPTH ) HYD20430
             PRATIO = WRATIO * 1.E2                                           HYD20440
             IF ( KWATER (KNODE ) . GT. 0 )  GO TO 50                         HYD20450
      C**** IF APPLIED WATERS HAVE NOT BEEN PERCOLATED THROUGH SOIL           HYD20460
      CALL SUBROUTINE TO EQUILIBRATE INITIAL SOIL ANALYSIS FOR EACH SEGMENT   HYD20480
             CALL FRSTIM ( KNODE , K, IW )                                    HYD20490
      C      CALL SCRIBE (IW)                                                 HYD20500
      C**** COLUMN - EQUILIBRATE ON BASIS OF ORIGINAL SOIL ANALYSIS           HYD20470
      CALL SUBROUTINE TO CALCULATE SOLUTION - PRECIPITATION OF GYPSUM **      HYD20510
      CASO4 . 2H2O                                                            HYD20520
         50  CALL GYPEX(KNODE,K,IW,PRATIO)                                    HYD20530
      C      CALL SCRIBE (IW)                                                 HYD20540
      C      CALL SCRIBE (IW)                                                 HYD20550
             CA (1) = SLCA                                                    HYD20560
      CALL SUBROUTINE TO CALCULATE EXCHANGE OF CALCIUM AND SODIUM             HYD20570
             CALL EXCANA  ( KNODE , K, IW , PRATIO )                          HYD20580
      C      CALL SCRIBE (IW)                                                 HYD20590
             CA (2) = SLCA                                                    HYD20600
      CALL SUBROUTINE TO CALCULATE EXCHANGE OF CALCIUM AND MAGNESIUM          HYD20610
             CALL EXCAMG  ( KNODE , K, IW , PRATIO )                          HYD20620
      C      CALL SCRIBE (IW)                                                 HYD20630
             CA (3) = SLCA                                                    HYD20640
      CALL SUBROUTINE TO CALCULATE REACTION OF CALCIUM WITH CARBONATE -       HYD20650
      C**** BICARBONATE SYSTEM                                                HYD20660
             CALL CALCAR  ( KNODE , K, IW , PRATIO )                          HYD20670
      C      CALL SCRIBE (IW)                                                 HYD20680
      CA (4) = SLCA                                                     HYD20690
CHECK TO DETERMINE IF EQUILIBRIUM HAS BEEN ATTAINED IN THE SOIL - WATER HYD20700
C**** SYSTEM USING CONCENTRATION OF CALCIUM IN SOLUTION AS THE          HYD20710
CONVERGENT VARIABLE                                                     HYD20720
C     WRITE ( IW, 60 ) NCT , ( CA (M) , M = 1, 4 )                      HYD20730
C  60 FORMAT ( 1H1, 8X, 10HCOUNTER = , I2 , / 4 ( 8X, F15.8 ))          HYD20740
      NCT = NCT + 1                                                     HYD20750
      IF ( NCT . GT. 10 )  GO TO 200                                    HYD20760
      DO 70 L = 1, 4                                                    HYD20770
      EPSLON = CA (L) - SLCA                                            HYD20780
      IF ( ABS (EPSLON) . GT. 5.E-4 )  GO TO 50                         HYD20790
   70 CONTINUE                                                          HYD20800
C**** COMPUTATIONAL SEQUENCE BACK INTO SOIL ARRAY                        HYD20810
      CALL RELOAD ( KNODE , K , NSEGS , ISW )                           HYD20820
C**** KTH SEGMENT HAS BEEN EQUILIBRATED CALL SUBROUTINE ENTRY TO LOAD    HYD20830
C     WRITE ( IW , 80 ) NCT, (CA (M) , M = 1, 4 )                       HYD20840
C  80 FORMAT ( // 8X, 10HCOUNTER = , I2  , / 4 ( 8X, F15.8) /           HYD20850
C    1              17HENDING CONDITIONS / )                            HYD20860
C     CALL SCRIBE (IW)                                                  HYD20870
  200 CONTINUE                                                          HYD20880
C**** THE SOIL COLUMN HAS BEEN EQUILIBRATED FOR THIS PARTICULAR          HYD20890
C**** ITERATION ** TEST FIRST TO DETERMINE IF THIS ITERATION WAS FOR     HYD20900
C**** THE EQUILIBRATION OF THE ORIGINAL SOIL ANALYSIS                    HYD20910
      IF ( KWATER ( KNODE ) . EQ. 0 )   GO TO 300                       HYD20920
C**** EQUILIBRATION HAS BEEN FOR THE SOIL COLUMN AFTER APPLICATION       HYD20930
C**** OF SURFACE WATERS                                                  HYD20940
      GO TO 310                                                         HYD20950
C**** MOVE APPLIED WATER INTO FIRST SEGMENT AND  EQUILIBRATE             HYD20960
  300 MIN = 0                                                           HYD20970
      MAX = NSEGS                                                       HYD20980
C**** UPDATE COUNTER OF NUMBER OF APPLICATIONS OF SURFACE WATERS         HYD20990
      KWATER ( KNODE ) = KWATER (KNODE ) + 1                            HYD21000
      ISW = 3                                                           HYD21010
  310 MIN = MIN + 1                                                     HYD21020
      IF ( MIN . GT. NSEGS )  GO TO 350                                 HYD21030
      KV = MIN                                                          HYD21040
      CALL SMOVER ( KNODE , KV , NSEGS , ISW )                          HYD21050
      GO TO 35                                                          HYD21060
C**** THIS IS THE LAST EQUILIBRATION FOR THIS SOIL COLUMN FOR THIS TIME  HYD21070
C**** FRAME ** MIX SOLUTION IN LOWEREMOST SEGMENT WITH BTANK **** SET    HYD21080
C**** VOLUME OF BTANK                                                    HYD21090
  350 ISW = 4                                                           HYD21100
      CALL SMOVER ( KNODE , KV , NSEGS , ISW )                          HYD21110
 2000 RETURN                                                            HYD21130
      END                                                               HYD21140

MEMORY REQUIREMENTS 00098C BYTES

HIGHEST SEVERITY CODE WAS  0


      SUBROUTINE SETUP ( KN , KV, NSEGS, ISW )
C**** THIS SUBROUTINE HAS MULTIPLE ENTRIES AND CONTROLS THE TRANSFER     HYD21160
C**** OF DATA TO AND FROM THE COMPUTATIONAL VARIABLE NAME SEQUENCE AS    HYD21170

C**** THIS DATA RELATES TO THAT STORED IN THE ARRAY TITLED SOIL. THE     HYD21180
C**** SUBROUTINE ALSO SIMULATES THE VERTICAL DISPLACEMENT OF SOLUTION    HYD21190
C**** FROM ONE SEGMENT TO THE NEXT LOWER SEGMENT (PISTON EFFECT). KN ANDHYD21200
C**** KV IN THE ARGUMENT LIST REPRESENT THE NODE INDEX AND SEGMENT INDEXHYD21210
C**** RESPECTIVELY.                                                      HYD21220
       COMMON / PROPER / SOIL( 5, 10, 21), BTANK( 5, 10), TTANK( 5, 10),HYD21230
     1 BRTANK (5, 10)  , NSEG ( 5) , CONUSE ( 5, 10, 30)                HYD21240
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,   HYD21250
     1                 SLNO3 ,UCASO4 , UMGSO4                           HYD21260
      COMMON /SOLID/ CATEX, GYPSUM, SLIME ,BDENS, EXCA ,EXNA, EXMG ,    HYD21270
     1                EXTRAC , DEPTH, SEGVOL , INTER                    HYD21280
      DIMENSION  EQVWT (8) , VALNCE (8)                                 HYD21290
      REAL INTER                                                        HYD21300
      DATA   EQVWT            / 20.4 ,12.16,23.,35.46,48.03,30.,61.01,  HYD21310
     1                          62.008 /                                HYD21320
C     DATA ((EQVWT(K), K=1,8) = 20.4 ,12.16,23.,35.46,48.03,30.,61.01,  HYD21340
C    1                          62.008 )                                HYD21330
      DATA  VALNCE              / 2., 2., 1.,1.,2.,1.,2.,1./            HYD21350
C**** THE MAIN ENTRY TO THIS SUBROUTINE CONVERTS UNITS OF INITIAL SOIL   HYD21360
C**** ANALYIS INTO COMPUTATIONAL UNITS                                   HYD21370
CONVERSION OF MILLIEQUIVALENTS PER LITER (MEQ/L) TO COMPUTATIONAL UNITS HYD21380
C**** OF MOLS PER LITER (SOLUTION)- MOLS/LITER =(MEQ/L) /(VALENCE * 1.E3HYD21390
      IF ( ISW . NE. 0 ) GO TO 70                                       HYD21400
   50 DO 60 K = 1,8                                                     HYD21410
      SOIL (KN,KV,K) = SOIL (KN,KV,K) / (VALNCE (K) * 1.E3)             HYD21420
   60 CONTINUE                                                          HYD21430
CONVERT MILLIEQUIVALENTS PER 100 GRAMS TO COMPUTATION UNITS OF MOLS/GRAMHYD21440
C**** WHEN ISW = 0 CONVERSION IS NECESSARY FOR INITIAL SOIL ANALYSIS     HYD21450
C**** PER GRAM (SOLID)- MOLS/GRAM = (MEQ/100GRAMS) /(VALENCE * 1.E5)     HYD21460
      SOIL (KN,KV,11) = SOIL (KN,KV,11)/ (VALNCE(4)* 1.E5)              HYD21470
      SOIL (KN,KV,12) = SOIL (KN,KV,12)/ (VALNCE(5)* 1.E5)              HYD21480
C**** WHEN ISW NOT EQUAL ZERO COMPUTATIONAL UNITS RETAINED NO             HYD21490
C**** CONVERSION REQUIRED                                                HYD21500
C**** PLACE DATA OF SOIL ARRAY IN COMPUTATIONAL VARIABLE NAME SEQUENCE   HYD21510
   70 SLCA   = SOIL (KN,KV, 1)                                          HYD21520
      SLMG   = SOIL (KN,KV, 2)                                          HYD21530
      SLNA   = SOIL (KN,KV, 3)                                          HYD21540
      SLCL   = SOIL (KN,KV, 4)                                          HYD21550
      SLSO4  = SOIL (KN,KV, 5)                                          HYD21560
      SLHCO3 = SOIL (KN,KV, 6)                                          HYD21570
      SLCO3  = SOIL (KN,KV, 7)                                          HYD21580
      SLNO3  = SOIL (KN,KV, 8)                                          HYD21590
      EXTRAC = SOIL (KN,KV, 9)                                          HYD21600
      SEGVOL = SOIL (KN,KV,10)                                          HYD21610
      CATEX  = SOIL (KN,KV,11)                                          HYD21620
      GYPSUM = SOIL (KN,KV,12)                                          HYD21630
      SLIME  = SOIL (KN,KV,13)                                          HYD21640
      BDENS  = SOIL (KN,KV,14)                                          HYD21650
      DEPTH  = SOIL (KN,KV,15)                                          HYD21660
      EXCA   = SOIL (KN,KV,16)                                          HYD21670
      EXMG   = SOIL (KN,KV,17)                                          HYD21680
      EXNA   = SOIL (KN,KV,18)                                          HYD21690
      UCASO4 = SOIL (KN,KV,19)                                          HYD21700
      UMGSO4 = SOIL (KN,KV,20)                                          HYD21710
      INTER =  SOIL(KN,KV,21)                                           HYD21720
      GO TO 2000                                                        HYD21730
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C**** THIS ENTRY MOVES OF SOLUTION OF BOTTOMMOST SEGMENT INTO RTANK ARRAHYD21740
C**** USING A LINEAR MIX AFTER CONVERTING UNITS OF COMPUTATIONAL MODE TOHYD21750
C**** PARTS PER MILLION(PPM)  WHERE PPM = MOLES PER LITER * EQUIVALENT  HYD21760
C**** WEIGHT OF SPECIES * VALENCE OF SPECIES * 1.E3 . ALSO MOVES SOLUTIOHYD21770
C**** OF ONE SEGMENT TO NEXT LOWER SEGMENT KEEPING COMPUTATIONAL UNITS OHYD21780
C**** MOLS PER LITER  AS WELL AS PLACING APPLIED WATERS IN SOLUTION OF  HYD21790
C**** UPPERMOST SEGMENT CONVERTING UNITS OF PPM  TO MOLS/LITER  WHERE    HYD21800
C**** MOLS PER LITER = PPM /(EQUIVALENT WEIGHT * VALENCE * 1.E3)         HYD21810
      ENTRY SMOVER                                                      HYD21820
      KG = KV                                                           HYD21830
      IF ( KV . GT. 1 ) KG = KV - 1                                     HYD21840
      KR = NSEGS                                                        HYD21850
      DO 90 K =1,9                                                      HYD21860
      L = K + 1                                                         HYD21870
      RTANK (KN,L) =(RTANK (KN,L) +(SOIL (KN,KR,K)* EQVWT(K) * VALNCE(K)HYD21880
     1                .* 1.E3 )) * 5.E-1                                HYD21890
   90 CONTINUE                                                          HYD21900
      IF ( ISW . EQ. 4 ) GO TO 2000                                     HYD21910
C**** MOVE SOLUTION OF ONE SEGMENT TO NEXT LOWER SEGMENT                HYD21920
   95 KR = KR - 1                                                       HYD21930
      IF ( KR . LT. KG )  GO TO 120                                     HYD21940
   97 KP = KR + 1                                                       HYD21950
      DO 100 K = 1, 8                                                   HYD21960
      SOIL(KN,KP,K) = SOIL(KN,KR,K)                                     HYD21970
  100 CONTINUE                                                          HYD21980
      SOIL (KN,KP,19) = SOIL(KN,KR,19)                                  HYD21990
      SOIL (KN,KP,20) = SOIL(KN,KR,20)                                  HYD22000
      GO TO 95                                                          HYD22010
  120 IF ( KV. GT. 1 )  GO TO 2000                                      HYD22020
C**** PLACE APPLIED WATERS INTO UPPERMOIST SEGMENT                      HYD22030
      DO 130 K = 1, 8                                                   HYD22040
      L = K + 1                                                         HYD22050
      SOIL(KN, 1,K) = TTANK(KN,L) / (EQVWT(K) * VALNCE(K) * 1.E3)       HYD22060
  130 CONTINUE                                                          HYD22070
      GO TO 2000                                                        HYD22080
C**** AT THE COMPLETION OF EQILIBRATION OF EACH SEGMENT THIS ENTRY RELOAHYD22090
C**** ARRAY SOIL BY TRANSFER OF DATA FROM COMPUTATIONAL VARIABLE NAME   HYD22100
C**** SEQUENCE.  ALL UNITS ARE IN COMPUTATIONAL UNITS.                  HYD22110
      ENTRY RELOAD                                                      HYD22120
      SOIL (KN,KV, 1) = SLCA                                            HYD22130
      SOIL (KN,KV, 2) = SLMG                                            HYD22140
      SOIL (KN,KV, 3) = SLNA                                            HYD22150
      SOIL (KN,KV, 4) = SLCL                                            HYD22160
      SOIL (KN,KV, 5) = SLSO4                                           HYD22170
      SOIL (KN,KV, 6) = SLHCO3                                          HYD22180
      SOIL (KN,KV, 7) = SLCO3                                           HYD22190
      SOIL (KN,KV, 8) = SLNO3                                           HYD22200
      SOIL (KN,KV,12) = GYPSUM                                          HYD22210
      SOIL (KN,KV,13) = SLIME                                           HYD22220
      SOIL (KN,KV,16) = EXCA                                            HYD22230
      SOIL (KN,KV,17) = EXMG                                            HYD22240
      SOIL (KN,KV,18) = EXNA                                            HYD22250
      SOIL (KN,KV,19) = UCASO4                                          HYD22260
      SOIL (KN,KV,20) = UMGSO4                                          HYD22270
      SOIL (KN,KV,21) = INTER                                           HYD22280
 2000 RETURN                                                            HYD22290

      END                                                               HYD22300

EMORY REQUIREMENTS 000AAC BYTES

IGHEST SEVERITY CODE WAS  0


      SUBROUTINE FRSTIM ( KNODE , KSEG , IW )
C**** THIS SUBROUTINE IS USED TO CALCULATE IONIC CONCENTRATIONS         HYD22320
C**** OF CALCIUM, MAGNESIUM ,SULFATE AND THE UNDISSOCIATED CALCIUM      HYD22330
C**** SULFATE AND MAGNESIUM SULFATE . THE SUBROUTINE ALSO CALCULATES    HYD22340
C**** THE EXCHANGEABLE CALCIUM ,MAGNESIUM AND SODIUM . THIS SUBROUTINE  HYD22350.
C**** IS USED ONLY ONCE FOR EACH SOIL SEGMENT AND USES DATA FROM INITIALHYD22360
C**** SOIL ANALSIS.                                                     HYD22370
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,   HYD22380
     1                 SLNO3 ,UCASO4 , UMGSO4                           HYD22390
      COMMON /SOLID/ CATEX,GYPSUM, SLIME, BDENS, EXCA, EXNA, EXMG,      HYD22400
     1               EXTRAC, DEPTH, SEGVOL, INTER                       HYD22410
      DIMENSION CA (10)                                                 HYD22420
      INTEGER  $SC1/'FRST'/,$SC2/'TRUE'/                                         B
      DATA  TECA/ 4.9E-3/, TECMG/ 5.9E-3/                               HYD22430
CALCULATE ACTIVITY COEFFICIENT FOR DIVALENT ION (GAMMA2)                HYD22440
      GAMMA2 = G(2)
CALCULATE CONCENTRATION OF UNCOMBINED SULFATE ION AS A POSITIVE REAL    HYD22460
C**** ROOT OF A THIRD DEGREE POLNOMIAL . LET THERMODYNAMIC EQUILIBRIUM  HYD22470
C**** CONSTANTS FOR UNDISSOCIATED CALCIUM SULFATE AND MAGNESIUM SULFATE HYD22480
C**** = 4.9E-3 AND 5.9E-3 RESPECTIVELY                                  HYD22490
CHECK FIRST TO DETERMINE IF SULFATE IS IN SOLUTION - IF NO SULFATE IS   HYD22500
C**** SOLUTION BYPASS COMPUTATIONS WHERE SULFATE IS A VARIABLE          HYD22510
      IF(SLSO4.LE.0.0)  GO TO 60                                        HYD22520
CALCULATE COEFFICIENTS FOR THIRD DEGREE POLYNOMIAL                      HYD22530
      DO 50 K = 1,10                                                    HYD22540
      CA(K) = 0.0                                                       HYD22550
   50 CONTINUE                                                          HYD22560
      GSQR = GAMMA2 * GAMMA2                                            HYD22570
      CA(4) = GSQR * GSQR                                               HYD22580
      CA(3) = GSQR *(TECA + TECMG) + GSQR * GSQR * (SLCA + SLMG -SLSO4) HYD22590
      CA(2) =  TECA* TECMG + GSQR *(TECMG* SLCA + TECA* SLMG - SLSO4 *  HYD22600
     1        (TECA + TECMG))                                           HYD22610
      CA(1) = - SLSO4 * TECA * TECMG                                    HYD22620
C**** CALCULATE UNCOMBINED SO4 AS ROOT GREATER THAN ZERO AND LESS THAN  HYD22630
C**** SLSO4                                                             HYD22640
      CONST = 0.0                                                       HYD22650
CALCULATE A POSITIVE ROOT (REAL) IN RANGE XMIN - XMAX                   HYD22660
      XMIN = 0.0                                                        HYD22670
      XMAX = SLSO4                                                      HYD22680
C**** SET CONVERGENCE CRITERION (TESTA) SO THAT F(X) IS LESS THAN 1.E-6 HYD22690
      TESTA = 1.E-6                                                     HYD22700
      MOLE = $SC1                                                       HYD22710
      FSO4 = ROOT (CONST,XMAX, XMIN, MOLE , CA , TESTA )                HYD22720
      IF(MOLE.NE.$SC2    ) GO TO 900                                    HYD22730
CALCULATE CONCENTRATION OF UNDISSOCIATED CASO4 (MOLS/LITER)             HYD22740
      UCASO4 = SLCA * FSO4 * GSQR / (TECA + GSQR * FSO4)                HYD22750
CALCULATE UNCOMBINED CA (MOLES/ LITER)                                  HYD22760
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      SLCA = SLCA - UCASO4                                              HYD22770
CALCULATE CONCENTRATION OF UNDISSOCIATED MGSO4 (MOLS/ LITER)            HYD22780
      UMGSO4 =  SLMG * FSO4 * GSQR / (TFCMG + GSQR * FSO4)              HYD22790
CALCULATE UNCOMBINED MG (MOLS / LITER)                                  HYD22800
      SLMG = SLMG - UMGSO4                                              HYD22810
C**** CHANGE CONCENTRATIONS OF DIVALENT IONS FROM MOLS PER LITER TO     HYD22820
C**** EQUIVALENTS PER LITER                                             HYD22830
      SLMG = SLMG * 2.                                                  HYD22840
      SLCA = SLCA * 2.                                                  HYD22850
      GO TO 70                                                          HYD22860
   60 FSO4 = 0.0                                                        HYD22870
CALCULATE EXCHANGEABLE CALCIUM (EXCA) IN EQUIVALENTS PER GRAM           HYD22880
C**** LET EXCHANGE CONSTANT CA-MG = 0.67 AND FOR CA-NA = 2.0            HYD22890
CALCULATE ACTIVITY COEFFICIENT FOR MONOVALENT ION (GAMMA1)              HYD22900
   70 GAMMA1 = G(1)
      EXCA =  SLNA * GAMMA1/(2.0 * SQRT(SLCA * GAMMA2))  + 1.0  + 6.7E-1HYD22920
     1          * SLMG /SLCA                                            HYD22930
      EXCA = CATEX / EXCA                                               HYD22940
CALCULATE EXCHANGEABLE SODIUM  (EXNA) IN EQUIVALENTS PER GRAM           HYD22950
      EXNA = EXCA * SLNA * GAMMA1 / (2.0 * SQRT (SLCA * GAMMA2))        HYD22960
CALCULATE EXCHANGEABLE MAGNESIUM (EXMG) IN EQUIVALENTS PER GRAM         HYD22970
      EXMG = CATEX - EXCA - EXNA                                        HYD22980
C**** CHANGE UNITS FROM EQUIVALENTS PER GRAM AND EQUIVALENTS PER        HYD22990
C**** LITER TO MOLS PER GRAM AND MOLS PER LITER                         HYD23000
      EXCA = EXCA * 5.E-1                                               HYD23010
      EXMG = EXMG * 5.E-1                                               HYD23020
      SLMG = SLMG * 5.E-1                                               HYD23030
      SLCA = SLCA * 5.E-1                                               HYD23040
      SLSO4 = FSO4                                                      HYD23050
      GO TO 2000                                                        HYD23060
C**** ERROR MESSAGES ARE PRINTED HERE                                   HYD23070
  900 WRITE (IW,910) KNODE , KSEG                                       HYD23080
  910 FORMAT (1H1,14HERROR IN NODE   ,I3 ,2X ,12HSEGMENT NO. , I3,      HYD23090
     1         15HBECAUSE OF ****    )                                  HYD23100
  960 WRITE (IW,965) FSO4 , SLSO4                                       HYD23110
  965 FORMAT (8X , 20HROOT IS OUT OF RANGE , 7HROOT =    ,F10.5 ,       HYD23120
     1        8X,15HRANGE = 0.0 TO   , F10.5  )                         HYD23130
      CALL EXIT                                                         HYD23140
 2000 RETURN                                                            HYD23150
      END                                                               HYD23160

EMORY REQUIREMENTS 000600 BYTES

IIGHEST SEVERITY CODE WAS  0


      SUBROUTINE GYPEX (KNODE, KSEG, IW, PRATIO )
C**** THIS SUBROUTINE IS USED TO CALCULATE THE SOLUTION OR PRECIPITATIONHYD23180
C**** OF GYPSUM ( CASO4*2H2O ) AND THE REQUIREMENTS OF CALCIUM          HYD23190
C**** AND MAGNESIUM FOR THE UNDISSOCIATED ION PAIRS CASO4 AND MGSO4.    HYD23200
      INTEGER  $SC1/'GYPS'/,$SC2/'CASO'/,$SC3/'MGSO'/
      DIMENSION CA (10)                                                          B
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,   HYD23210
     1                 SLNO3 ,UCASO4 , UMGSO4                           HYD23220
                                                                        HYD23230
      COMMON /SOLID/ CATEX, GYPSUM, SLIME ,BDENS, EXCA ,EXNA, EXMG ,    HYD23240
     1               EXTRAC , DEPTH, SEGVOL , INTER                     HYD23250
CALCULATE ACTIVITY COEFFICIENCT OF DIVALENT ION (GAMMA2)                HYD23260
      GAMMA2 = G(2)                                                     HYD23270
      GSQR = GAMMA2 * GAMMA2                                            HYD23280
CALCULATE CHANGES IN CONCENTRATIONS OF CALCIUM AND SULFATE (X). GIVEN THHYD23290
C**** SOLUBILITY PRODUCT (KSP) OF GYPSUM = 2.4E-5. SOLVE FOR (X) USING  HYD23300
C**** QUADRATIC  FORM OF KSP = ((SLCA + X)(SLSO4 +X))* GAMMA2 **2 . WHENHYD23310
C**** (X) IS POSITIVE SOLUTION IS UNDERSATURATED. WHEN (X) IS ZERO OR   HYD23320
C**** NEGATIVE SOLUTION IS SATURATED OR SUPERSATURATED. COMPUTE COEFFICIHYD23330
C**** FOR QUADRATIC EQUATION                                            HYD23340
   40 CA(1) = 1.0                                                       HYD23350
      CA(2) = SLCA + SLSO4                                              HYD23360
      CA(3) = (SLCA * SLSO4) - (2.4E-5 / GSQR)                          HYD23370
      MOLE = $SC1                                                       HYD23380
CONVERT GYPSUM (SOLID) FROM MOLS/GRAM TO MOLES PER LITER - PRATIO IS    HYD23390
C**** MOISTURE CONTENT IN PERCENCT - MOLS/LITER = (1.0 /PRATIO)* 1.E5   HYD23400
      GYPSOL = GYPSUM * (1.0 /PRATIO) * 1.E5                            HYD23410
      X = ROOTWO (KNODE,KSEG,CA, MOLE, IW)                              HYD23420
      IF(X.LT.0.0)  GO TO 60                                            HYD23430
CONDITION-SOLUTION IS UNDERSATURED                                      HYD23440
      Y = GYPSOL - X                                                    HYD23450
      IF(Y.LE.0.0)  GO TO 50                                            HYD23460
CONDITION - ENOUGH GYPSUM IN SOLID STATE TO SATURATE SOLUTION - UPDATE  HYD23470
C**** CALCIUM AND SULFATE   CONCENTRATIONS.                             HYD23480
      SLCA = SLCA + X                                                   HYD23490
      SLSO4 = SLSO4 + X                                                 HYD23500
      GYPSOL = Y                                                        HYD23510
      GO TO 70                                                          HYD23520
CONDITION-NOT ENOUGH GYPSUM IN SOLID STATE TO SATURATE SOLUTION DISSOLVEHYD23530
C**** ALL GYPSUM - UPDATE CALCIUM AND SULFATE CONCENTRATIONS            HYD23540
   50 GYPSOL = 0.0                                                      HYD23550
      SLCA = SLCA + X                                                   HYD23560
      SLSO4 = SLSO4 + X                                                 HYD23570
      GO TO 100                                                         HYD23580
CONDITION-SOLUTION IS SUPERSATURATED ADD EXCESS TO GYPSUM IN SOLID STATEHYD23590
C**** UPDATE CALCIUM AND SULFATE CONCENTRATIONS                         HYD23600
   60 X = ABS(X)                                                        HYD23610
      GYPSOL = GYPSOL + X                                               HYD23620
      SLCA = SLCA - X                                                   HYD23630
      SLSO4 = SLSO4 - X                                                 HYD23640
CONDITION - TEST IF UNDISSOCIATED CASO4 (UCASO4) IS AT MAXIMUM CONCENTRAHYD23650
C**** OF 4.987E-3 MOLS /LITER                                           HYD23660
   70 IF (UCASO4.GE.4.987E-3) GO TO 90                                  HYD23670
CONDITION - UCASO4 NOT AT MAXIMUM CONCENTRATION                         HYD23680
      W = 4.987E-3 - UCASO4                                             HYD23690
      IF (W.LT.GYPSOL)  GO TO 80                                        HYD23700
CONDITION-NOT ENOUGH RESIDUAL GYPSUM TO BRING UCASO4 TO MAXIMUM CONCENTRHYD23710
      UCASO4 = UCASO4 + GYPSOL                                          HYD23720
      GYPSOL = 0.0                                                      HYD23730
      GO TO 100                                                         HYD23740
CONDITION - ENOUGH RESIDUAL GYPSUM TO MEET MAXIMUM CONCENTRATION OF UCASHYD23750
   80 GYPSOL = GYPSOL - W                                               HYD23760
      UCASO4 = 4.987E-3                                                 HYD23770
CONVERT-RESIDUAL GYPSUM FOR MOLS/LITER BACK TO MOLS/GRAM                HYD23780
   90 GYPSUM = GYPSOL *  PRATIO / 1.E5                                  HYD23790
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      GO TO 200                                                         HYD23800
CALCULATE CHANGES IN CALCIUM AND SULFATE CONCENTRATIONS (X) TO SATISFY  HYD23810
C**** UNDISSOCIATED CASO4 (UCASO4) - WHERE EQUATION OF EQUILIBRIUM IS   HYD23820
C**** EQUILIBRIUM CONSTANT = 4.9E-3 - COEFFICIENTS FOR SECOND DEGREE    HYD23830
C**** EQUATION ARE AFTER RECOMPUTING IONIC STRENGTH                     HYD23840
  100 GAMMA2 = G(2)
      GSQR = GAMMA2 * GAMMA2                                            HYD23860
  110 CA(1) = GSQR                                                      HYD23870
      CA(2) = GSQR * (SLCA + SLSO4) + 4.9E-3                            HYD23880
      CA(3) =(GSQR * SLCA* SLSO4) -(4.9E-3 * UCASO4)                    HYD23890
      MOLE = $SC2                                                       HYD23900
      X = ROOTWO (KNODE, KSEG, CA, MOLE ,IW)                            HYD23910
C**** UPDATE CONCENTRATIONS OF CASO4, CA AND SO4                        HYD23920
      UCASO4 = UCASO4 - X                                               HYD23930
      SLCA = SLCA + X                                                   HYD23940
      SLSO4 = SLSO4 + X                                                 HYD23950
CALCULATE CHANGES IN MAGNESIUM AND SULFATE CONCENTRATIONS (X) TO SATISFYHYD23960
C**** UNDISSOCIATED MGSO4 (UMGSO4)- WHERE EQUATION OF EQUILIBRIUM IS    HYD23970
C**** (UMGSO4 -X ) K = GAMMA2**2((SLMG +X )(SLSO4 +X)) AND K = THERMODYNHYD23980
C**** EQUILIBRIUM CONSTANT = 5.9E-3 - COEFFICIENTS FOR SECOND DEGREE    HYD23990
C**** EQUATION ARE -                                                    HYD24000
  200 CA(1) = GSQR                                                      HYD24010
      CA(2) = GSQR * (SLMG + SLSO4) + 5.9E-3                            HYD24020
      CA(3) = (GSQR * SLMG * SLSO4) -(5.9E-3 * UMGSO4)                  HYD24030
      MOLE = $SC3                                                       HYD24040
      X = ROOTWO (KNODE, KSEG, CA, MOLE, IW)                            HYD24050
C**** UPDATE CONCENTRATIONS OF MGSO4, MG AND SO4                        HYD24060
      UMGSO4 = UMGSO4 - X                                               HYD24070
      SLMG = SLMG + X                                                   HYD24080
      SLSO4 = SLSO4 + X                                                 HYD24090
 2000 RETURN                                                            HYD24100
      END                                                               HYD24110

MEMORY REQUIREMENTS 000574 BYTES

HIGHEST SEVERITY CODE WAS  0


      SUBROUTINE EXCANA ( KNODE , KSEG , IW, PRATIO )
C**** THIS SUBROUTINE CALCULATES THE SODIUM (MONOVALENT) EXCHANGE WITH  HYD24130
C**** CALCIUM(DIVALENT).          THE GAPON EQUATION EXPRESSING THE     HYD24140
C**** RELATIONSHIP OF CALCIUM AND SODIUM IN TERMS OF CONCENTRATIONS     HYD24150
C**** WAS USED. LET (X) REPRESENT THE CHANGE IN CONCENTRATION OF THE    HYD24160
C**** DIVALENT ION IN THE SOLID PHASE IN UNITS OF MOLS PER GRAM.        HYD24170
C**** CALCULATE COEFFICIENTS FOR THE FOURTH DEGREE POLYNOMIAL-- BETA    HYD24180
C**** IS THE CONVERSION FACTOR TO CONVERT MOLS PER GRAM TO MOLS         HYD24190
C**** PER LITER AND HAS UNITS OF GRAMS OF SOLID PER LITER OF SOLUTION   HYD24200
C**** EXCHANGE COEFFICIENT K (DEX) = 7.07E-1                            HYD24210
                                                                          B
      INTEGER  $SC1/'EXCA'/,$SC2/'TRUE'/                                HYD24220
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,   HYD24230
     1                 SLNO3 ,UCASO4 , UMGSO4                           HYD24240
      COMMON /SOLID/ CATEX, GYPSUM, SLIME ,BDENS, EXCA ,EXNA, EXMG ,    HYD24250
     1               EXTRAC , DEPTH, SEGVOL , INTER                     HYD24260
      DIMENSION CA (10)

      DIMENSION T(4)                                                    HYD24270
      DEX = 7.07E-1                                                     HYD24280
C**** IF THERE IS NO SODIUM IN SOLUTION OR SOLID  PHASE EXIT ROUTINE    HYD24290
      IF ( SLNA .EQ. 0.0. AND.EXNA . EQ. 0.0 )  GO TO 2000              HYD24300
CALCULATE MONOVALENT ACTIVITY COEFFICIENT GAMMA1                        HYD24310
      GAMMA1 = G(1)                                                     HYD24320
      DO 50 K = 1, 10                                                   HYD24330
      CA (K) = 0.0                                                      HYD24340
   50 CONTINUE                                                          HYD24350
      BETA = ( 1.0 / PRATIO) * 1.E5                                     HYD24360
C**** ARRANGE ORDER OF COEFFICIENTS IN INCREASING POWERS OF (X)         HYD24370
      GSQR = GAMMA1 * GAMMA1                                            HYD24380
      BETA2 = BETA * BETA                                               HYD24390
      DEX2 = DEX * DEX                                                  HYD24400
      CA(1) = ( GSQR * EXNA * EXNA * SLCA ) - ( DEX2 * EXCA * EXCA      HYD24410
     1        * SLNA * SLNA )                                           HYD24420
      CA(2) = GSQR * EXNA * ( 4.0 * SLCA + BETA * EXNA ) + 2.0 * DEX2*  HYD24430
     1        EXCA * SLNA * ( SLNA + 2.0 * BETA * EXCA )                HYD24440
      CA(3) = 4.0 * GSQR * ( SLCA + BETA * EXNA ) - 4.0 * DEX2* BETA *  HYD24450
     1       EXCA * ( BETA * EXCA + 2.0 * SLNA ) - DEX2 * SLNA* SLNA    HYD24460
      CA(4) = 4.0 * BETA * ( 2.0 * DEX2 * EXCA * BETA + GSQR + DEX2 *   HYD24470
     1        SLNA )                                                    HYD24480
      CA(5) = - 4.0*BETA2 * DEX2                                        HYD24490
      ISW = 1                                                           HYD24500
CALCULATE A POSITIVE ROOT (REAL) IN RANGE XMIN - XMAX                   HYD24510
      XMIN = 0.0                                                        HYD24520
      XMAX = EXCA                                                       HYD24530
      IF ( EXCA .GT. EXNA ) XMAX = EXNA                                 HYD24540
   60 MOLE = $SC1                                                       HYD24550
C**** SET CONVERGENCE CRITERION (TESTA) SO THAT F(X) IS LESS THAN 1.E-8 HYD24560
      TESTA = 1.E-8                                                     HYD24570
      X = ROOT ( CONST, XMAX , XMIN , MOLE , CA , TESTA )               HYD24580
      IF ( MOLE . EQ . $SC2    )  GO TO 68                              HYD24590
      GO TO ( 75, 68 ) , ISW                                            HYD24600
C**** TEST ROOT TO INSURE NO UPDATED CONCENTRATIONS ARE LESS THAN ZERO  HYD24610
   68 T(1) = EXNA + ( 2.0 * X )                                         HYD24620
      T(2) = EXCA - X                                                   HYD24630
      T(3) = SLNA - ( 2.0 * BETA * X )                                  HYD24640
      T(4) = SLCA + ( BETA * X )                                        HYD24650
      DO 70 K = 1,4                                                     HYD24660
      IF ( T (K) . LE.0.0 ) GO TO 75                                    HYD24670
   70 CONTINUE                                                          HYD24680
      GO TO 80                                                          HYD24690
   75 IF ( ISW . EQ. 2 )  GO TO 1000                                    HYD24700
CALCULATE A NEGATIVE ROOT (REAL) IN RANGE XMIN - XMAX                   HYD24710
      XMIN = - XMAX                                                     HYD24720
      XMAX= 0.0                                                         HYD24730
      ISW = 2                                                           HYD24740
      GO TO 60                                                          HYD24750
C**** UPDATE CALCIUM AND SODIUM CONCENTRATIONS IN SOLUTION AND SOLID    HYD24760
C**** PHASES                                                            HYD24770
   80 EXNA = T(1)                                                       HYD24780
      EXCA = T(2)                                                       HYD24790
      SLNA = T(3)                                                       HYD24800
      SLCA = T(4)                                                       HYD24810
      GO TO 2000                                                        HYD24820
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 1000 WRITE ( IW , 1005 ) KNODE , KSEG                                   HYD24830
 1005 FORMAT ( 1H1, 42HNO REAL ROOT EXISTS IN RANGE FOR CA-NA FOR  /     HYD24840
     1             7HNODE =   , I3 , 5X, 10HSEGMENT =   , I3 )           HYD24850
      WRITE ( IW, 1010 ) X, XMIN, XMAX, MOLE                             HYD24860
 1010 FORMAT ( // 8X, 4HX = , F20.8 , 3X, 7HXMIN = , F20.8 , 3X,         HYD24870
     1                  7HXMAX = , F20.8, 3X, 7HMOLE =  , A5 )           HYD24880
      CALL EXIT                                                          HYD24890
 2000 RETURN                                                             HYD24900
      END                                                                HYD24910

MEMORY REQUIREMENTS 0006F8 BYTES

HIGHEST SEVERITY CODE WAS  0


      SUBROUTINE EXCAMG ( KNODE, KSEG, IW, PRATIO )
      INTEGER  $SC1/'CALM'/                                                      B
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,    HYD24930
     1                 SLNO3 ,UCASO4 , UMGSO4                            HYD24940
      COMMON /SOLID/ CATEX, GYPSUM, SLIME ,BDENS, EXCA ,EXNA, EXMG ,     HYD24950
     1               EXTRAC , DEPTH, SEGVOL , INTER                      HYD24960
C**** THIS SUBROUTINE CALCULATES THE MAGNESIUM (DIVALENT) EXCHANGE WITH HYD24970
C**** CALCIUM (DIVALENT) . THE COMMON EQUATION EXPRESSING THE RELATIONSHHYD24980
C**** OF CALCIUM AND MAGNESIUM IN TERMS OF CONCENTRATIONS WAS USED.     HYD24990
C**** LET (X) REPRESENT THE CHANGE IN CONCENTRATION OF THE DIVALENT ION HYD25000
C**** IN THE SOLID PHASE IN UNITS OF MOLS PER GRAM. CALCULATE THE       HYD25010
C**** COEFFICIENTS OF SECOND DEGREE POLYNOMIAL - BETA = CONVERSION      HYD25020
C**** FACTOR TO CONVERT MOLS PER GRAM TO MOLS PER LITER AND HAS UNITS OFHYD25030
C**** GRAMS OF SOLID PER LITER OF SOLUTION. EXCHANGE COEFFICIENT        HYD25040
C**** K (DEX) = 6.7E-1                                                  HYD25050
      DIMENSION CA (10)                                                  HYD25060
      DEX = 6.7E-1                                                       HYD25070
      BETA = ( 1.0 / PRATIO ) * 1.E5                                     HYD25080
      CA(1) = BETA * ( 1.0 - DEX)                                        HYD25090
      CA(2)=BETA * ( DEX * EXCA + EXMG ) + DEX * SLMG + SLCA             HYD25100
      CA(3) = SLCA * EXMG - ( DEX * SLMG * EXCA )                        HYD25110
      MOLE = $SC1                                                        HYD25120
      X = ROOTWO ( KNODE , KSEG , CA , MOLE , IW )                       HYD25130
C**** UPDATE CONCENTRATIONS OF CALCIUM AND MAGNESIUM IN SOLUTION AND    HYD25140
C**** SOLID PHASES                                                      HYD25150
      SLCA = SLCA + ( BETA * X )                                         HYD25160
      SLMG = SLMG - ( BETA * X )                                         HYD25170
      EXCA = EXCA - X                                                    HYD25180
      EXMG = EXMG + X                                                    HYD25190
 2000 RETURN                                                             HYD25200
      END                                                                HYD25210

MEMORY REQUIREMENTS 0002EC BYTES

HIGHEST SEVERITY CODE WAS  0


      SUBROUTINE CALCAR ( KNODE, KSEG, IW, PRATIO )
C**** THIS SUBROUTINE IS USED TO CALCULATE THE REACTION OF CALCIUM      HYD25230

C**** WITH THE CARBONATES. IF   CACO3 ( LIME ) IS PRESENT IN THE SOLID  HYD25240
C**** PHASE THE INDICATOR SLIME WILL BE SET TO ONE , IF LIME IS NOT     HYD25250
C**** PRESENT SLIME WILL BE SET TO ZERO . LOG10 (KPRIME )= -1.68 *      HYD25260
C**** LOG10 (PRATIO) - LOG10 (INTER) , WHERE PRATIO = MOISTURE CONTENT  HYD25270
C**** IN PERCENT, KPRIME = SLCA * SLHCO3 * SLHCO3 * GAMMA1 * GAMMA1     HYD25280
C**** * GAMMA2 AND INTER = INTERCEPT. THE EXPRESSION FOR KPRIME WAS     HYD25290
C**** DERIVED USING A SIMPLE LINEAR REGRESSION ( BY DUTT ET AL )        HYD25300
C**** WITH A LOGARITHMIC TRANSFORM.                                     HYD25310
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,    HYD25320
     1                 SLNO3 ,UCASO4 , UMGSO4                            HYD25330
      COMMON /SOLID/ CATEX, GYPSUM, SLIME ,BDENS, EXCA ,EXNA, EXMG ,     HYD25340
     1               EXTRAC , DEPTH, SEGVOL , INTER                      HYD25350
      DIMENSION CA (10)                                                  HYD25360
      REAL KPRIME , INTER                                                HYD25370
      INTEGER  $SC1/'CALC'/,$SC2/'TRUE'/                                         B
CHECK IF LIME IS PRESENT IN SOLID PHASE                                  HYD25380
      IF ( SLIME .EQ. 0.0 )  GO TO 50                                    HYD25390
C**** LIME IS PRESENT CALCULATE KPRIME                                  HYD25400
      IF (INTER . NE . 0.0 )  GO TO 43                                   HYD25410
   40 GAMMA1 = G(1)                                                      HYD25420
      GAMMA2 = G(2)                                                      HYD25430
      KPRIME = SLCA * SLHCO3 *SLHCO3 * GAMMA1 * GAMMA1 * GAMMA 2         HYD25440
COMPUTE INTERCEPT ONCE ONLY FOR EACH SOIL SEGMENT                        HYD25450
      INTER = KPRIME * (PRATIO * * 1.68)                                 HYD25460
   43 KPRIME = INTER / (PRATIO ** 1.69 )                                 HYD25470
      DO 45 K = 1,10                                                     HYD25480
      CA (K) = 0.0                                                       HYD25490
   45 CONTINUE                                                           HYD25500
      GO TO 55                                                           HYD25510
C**** LIME IS NOT PRESENT IN SOLID PHASE ASSUME INTER = 4.52E2          HYD25520
   50 INTER = 4.52E2                                                     HYD25530
      KPRIME = INTER / ( PRATIO ** 1.68)                                 HYD25540
      GO TO 100                                                          HYD25550
CALCULATE SOLUBILITY OF  LIME ( CACO3) , USE EXPRESSION K = SLCA         HYD25560
C**** *SLHCO3*   SLHCO3 ** 2 * GAMMA1 **2 / SLH2CO3 ( THEN LET KPRIME   HYD25570
C**** = K * SLH2CO3.  LET (X) = CHANGE IN CONCENTRATION OF CALCIUM      HYD25580
C**** (DIVALENT)ION IN SOLUTION PHASE IN MOLS PER LITER. CALCULATE      HYD25590
C**** COEFFICIENTS FOR THIRD DEGREE POLYNOMIAL IN INCREASING POWERS  OF HYD25600
CALCULATE A POSITIVE ROOT (REAL) IN RANGE XMIN - XMAX                    HYD25610
   55 XMIN = 0.0                                                         HYD25620
      XMAX = SLHCO3                                                      HYD25630
      IF ( SLHCO3 . GT. SLCA ) XMAX = SLCA                               HYD25640
      ISW = 1                                                            HYD25650
   60 CA (1) = - KPRIME / ( GAMMA1 * GAMMA1 * GAMMA2 )                   HYD25660
      CA (2) = 4.0 * SLCA * SLHCO3 + ( SLHCO3 * SLHCO3 )                 HYD25670
      CA (3) = 4.0 * ( SLHCO3 + SLCA )                                   HYD25680
      CA (4) = 4.0                                                       HYD25690
   65 MOLE = $SC1                                                        HYD25700
      CONST = 0.0                                                        HYD25710
C**** SET CONVERGENCE CRITERION (TESTA) SO THAT F(X) IS LESS THAN 1.E-6 HYD25720
      TESTA = 1.E-6                                                      HYD25730
      X = ROOT ( CONST , XMAX , XMIN , MOLE , CA , TESTA )               HYD25740
      GO TO ( 67, 68 ) , ISW                                             HYD25750
   67 IF ( MOLE .EQ. $SC2     ) GO TO 69                                 HYD25760
CALCULATE A NEGATIVE ROOT (REAL) IN RANGE XMIN - XMAX                    HYD25770
      XMAX = 0.0                                                         HYD25780
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      XMIN = - XMAX                                                     HYD25790
      ISW = 2                                                           HYD25800
      GO TO 60                                                          HYD25810
   60 IF ( MOLE .NE. 4SC2     ) GO TO 1000                              HYD25820
C**** UPDATE CONCENTRATIONS OF CALCIUM (SLCA) AND BICARBONATE (SLHCO3)  HYD25830
C**** IN SOLUTION                                                       HYD25840
   65 SLCA = SLCA + X                                                   HYD25850
      SLHCO3 = SLHCO3 + X                                               HYD25860
   70 IF (SLIME . GT. 0.0 ) GO TO 2000                                  HYD25870
  100 TEMP = SLCA * SLHCO3 * SLHCO3 * GAMMA1 * GAMMA1 * GAMMA2          HYD25880
      IF ( TEMP .GE. KPRIME )  GO TO 43                                 HYD25890
      GO TO 2000                                                        HYD25900
 1000 WRITE ( IW, 1005 ) KNODE , KSEG                                   HYD25910
 1005 FORMAT(1H1, 9X, 28HNO REAL ROOT FOUND IN CALCAR   / 8X,           HYD25920
     1               7HNODE =     , I3 , 5X, 10HSEGMENT =  , I3 )       HYD25930
      CALL EXIT                                                         HYD25940
 2000 RETURN                                                            HYD25950
      END                                                               HYD25960

 MEMORY REQUIREMENTS 0005C4 BYTES

R HIGHEST SEVERITY CODE WAS  0

      SUBROUTINE SCRIBE (IW)                                            HYD25980
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,   HYD25990
     1                 SLNO3 ,UCASO4 , UMGSO4                           HYD26000
      COMMON /SOLID/ CATEX, GYPSUM, SLIME ,BDENS, EXCA ,EXNA, EXMG ,    HYD26010
     1               EXTRAC , DEPTH, SEGVOL  , INTER                    HYD26020
      REAL INTER                                                        HYD26020
      WRITE ( IW , 10 ) SLCA, SLMG, SLNA, SLCL , SLSO4 , SLHCO3 , SLNO3,HYD26030
     1       SLCO3,       EXTRAC, SEGVOL, CATEX, GYPSUM, SLIME , BDENS, HYD26040
     2                    DEPTH , EXCA, EXNA, EXMG, UCASO4 , UMGSO4   , HYD26050
     3                    INTER                                         HYD26060
   10 FORMAT (       8X, 9HSLCA    =  , F20.8/ 8X, 9HSLMG    =  , F20.8 / HYD26070
     A               8X, 9HSLNA    =  , F20.8/ 8X, 9HSLCL    =  , F20.8 / HYD26080
     B               8X, 9HSLSO4   =  , F20.8/ 8X, 9HSLHCO3  =  , F20.8 / HYD26090
     C               8X, 9HSLNO3   =  , F20.8/ 8X, 9HSLCO3   =  , F20.8 / HYD26100
     D               8X, 9HEXTRAC  =  , F20.8/ 8X, 9HSEGVOL  =  , F20.8 / HYD26110
     E               8X, 9HCATEX   =  , F20.8/ 8X, 9HGYPSUM  =  , F20.8 / HYD26120
     F               8X, 9HSLIME   =  , F20.8/ 8X, 9HBDENS   =  , F20.8 / HYD26130
     G               8X, 9HDEPTH   =  , F20.8/ 8X, 9HEXCA    =  , F20.8 / HYD26140
     H               8X, 9HEXNA    =  , F20.8/ 8X, 9HEXMG    =  , F20.8 / HYD26150
     I               8X, 9HUCASO4  =  , F20.8/ 8X, 9HUMGSO4  =  , F20.8 / HYD26160
     J               8X, 9HINTER   =  , F20.8/   )                      HYD26170
      RETURN                                                            HYD26180
      END                                                               HYD26190

 MEMORY REQUIREMENTS 0003B8 BYTES

R HIGHEST SEVERITY CODE WAS  0

      FUNCTION G(KVAL)
C*****                                                                  HYD26210
C**** THIS FUNCTION CALCULATES THE ACTIVITY COEFFICIENT (GAMMA)         HYD26220
C*****                                                                  HYD26240
      COMMON /SOLUTE / SLCA, SLMG, SLNA, SLCL , SLSO4, SLHCO3, SLCO3,   HYD26250
     1                 SLNO3 ,UCASO4 , UMGSO4                           HYD26260
CALCULATE THE IONIC STRENGTH OF ALL SPECIES IN SOLUTION (U) WHERE       HYD26270
C**** U= 1/2 (SUMMATION OF CONCENTRATION OF ION ( MOLS/LITER) TIMES     HYD26280
C**** VALENCE OF ION SQUARED - FOR ALL SPECIES)                         HYD26290
      U = 2.0 * (SLCA + SLMG + SLSO4 + SLCO3) + 5.E-1 * (SLNA + SLCL +  HYD26300
     1    SLNO3 + SLHCO3 )                                              HYD26310
CALCULATE ACTIVITY COEFFICIENT ******************** ION USING DEBYE-    HYD26320
C**** HUCKEL FORMULA AS A FUNCTION OF IONIC STRENGTH AND VALENCE        HYD26330
      COMP = 0.0                                                        HYD26340
      COMP = SQRT(U)                                                    HYD26350
      IF(U .GT. 0.1)GO TO 55                                            HYD26355
      GO TO ( 50, 100) , KVAL                                           HYD26360
   50 G      = EXP ( -1.17201 * COMP / ( 1.0 + COMP ))                  HYD26370
      GO TO 200                                                         HYD26380
  100 G      = EXP ( -4.68804 * COMP / ( 1.0 + COMP ))                  HYD26390
      GO TO 200                                                         HYD26391
   55 IF(U .GT. 0.5) GO TO 105                                          HYD26391
      GO TO(56, 101),KVAL                                               HYD26392
   56 G=EXP(-1.17201*(COMP/(1.0+COMP)-0.3*U))                           HYD26393
      GO TO 200                                                         HYD26394
  101 G=EXP(-4.68804*(COMP/(1.0+COMP)-0.3*U))                           HYD26395
      GO TO 200                                                         HYD26396
  105 WRITE(6,106)                                                      HYD26397
  106 FORMAT(2X,'THE IONIC STRENGTH IS GREATER THAN 0.5')               HYD26398
      CALL EXIT                                                         HYD26399
  200 RETURN                                                            HYD26400
      END                                                               HYD26410

 MEMORY REQUIREMENTS 000308 BYTES

R HIGHEST SEVERITY CODE WAS  0

      SUBROUTINE GRAFF(CYO,CYP,TX,N,MO,IYR)                             B
      DIMENSION CYO(122),CYP(122),TX(122)                               B
      DIMENSION DCYO(122),DCYP(122),DTX(122)                            B
      WRITE(6,700)                                                      B
  700 FORMAT(1H1,5X,'DATA SUMMARY AT EL PASO',//,5X,'YEAR',3X,'MONTH',5X B
     <,'OBS. CONC.',4X,'PRED. CONC.',5X,'NUMBER')                        B
      IF(MO-1)500,500,501                                               B
  500 MO=0                                                              B
      MSTART=1                                                          B
      GO TO 503                                                         B
  501 MN=MO                                                             B
      MO=MO-1                                                           B
      IF(MN .EQ. 5 .AND. IYR .EQ. 75)MO=100                             B
      DO 505 I=1,N                                                      B
      AN=I+MO                                                           B
  505 TX(I)=AN                                                          B
```

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```
      MM=13-MN                                                                                            B
      DO 504 I=1,MM                                                                                       B
      MO=I+MN-1                                                                                           B
      IF(MO .GT. MN)GO TO 40                                                                              B
      WRITE(6,701)IYR,MO,CYO(I),CYP(I),TX(I)                                                              B
      WRITE(7,703)IYR,MO,CYO(I),CYP(I),TX(I'                                                              B
      GO TO 504                                                                                           B
   40 WRITE(6,702)MO,CYO(I),CYP(I),TX(I)                                                                  B
      WRITE(7,703)IYR,MO,CYO(I),CYP(I),TX(I)                                                              B
  504 CONTINUE                                                                                            B
      MSTART=MM+1                                                                                         B
      IF(MN .EQ. 5 .AND. IYR .EQ. 75)ISTART=101+MM                                                        B
  503 DO 2 I=MSTART,N                                                                                     B
      MO=MO+1                                                                                             B
      IF(I.EQ.1)GO TO 4                                                                                   B
      IF(MO.LT.13)GO TO 3                                                                                 B
      IYR=IYR+1                                                                                           B
      MO=1                                                                                                B
    4 WRITE(6,701)IYR,MO,CYO(I),CYP(I),TX(I)                                                              B
      WRITE(7,703)IYR,MO,CYO(I),CYP(I),TX(I)                                                              B
  701 FORMAT(1H0,5X,'19',I2,5X,I3,2(5X,F10.2),5X,F6.0)                                                    B
  703 FORMAT(2I5,3F10.2)                                                                                  B
      GO TO 2                                                                                             B
    3 WRITE(6,702)MO,CYO(I),CYP(I),TX(I)                                                                  B
      WRITE(7,703)IYR,MO,CYO(I),CYP(I),TX(I)                                                              B
  702 FORMAT(1H0,14X,I3,2(5X,F10.2),5X,F6.0)                                                              B
    2 CONTINUE                                                                                            B
      RETURN                                                                                              B
      END                                                                                                 B

 MEMORY REQUIREMENTS 000D0C BYTES

 HIGHEST SEVERITY CODE WAS  0

1HIGHEST SEVERITY CODE WAS  0

 LNKEDT                                                                                  00:02:11
    PHASE    FLOW,*                                                                     CREATED
     INCLUDE FLOW,L                                                                     CREATED
     INCLUDE FLOW0001,L                                                                 CREATED
     INCLUDE FLOW0002,L                                                                 CREATED
     INCLUDE FLOW0003,L                                                                 CREATED
     INCLUDE FLOW0004,L                                                                 CREATED
     INCLUDE FLOW0005,L                                                                 CREATED
     INCLUDE FLOW0006,L                                                                 CREATED
     INCLUDE FLOW0007,L                                                                 CREATED
     INCLUDE FLOW0008,L                                                                 CREATED
     INCLUDE FLOW0009,L                                                                 CREATED
     INCLUDE FLOW0010,L                                                                 CREATED
     INCLUDE FLOW0011,L                                                                 CREATED
     INCLUDE FLOW0012,L                                                                 CREATED
     INCLUDE FLOW0013,L                                                                 CREATED
     INCLUDE FLOW0014,L                                                                 CREATED
     INCLUDE FLOW0015,L                                                                 CREATED
     INCLUDE FLOW0016,L                                                                 CREATED
     INCLUDE FLOW0017,L                                                                 CREATED
     INCLUDE FLOW0018,L                                                                 CREATED
```

APPENDIX C

C. SAMPLE DATA INPUT AND MODEL OUTPUT FOR THE MESILLA VALLEY

```
                    ***  LISTING OF INPUT DATA  ***

JREAD =    1
RESEARCH IN CONJUNCTIVE USE STUDY FOR THE MESILLA PROJECT                 1
CONNOD101102  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
CONNOD102  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
CONSEQ101 15  1 -1 -2  2 -3  3  4  5  6  7  8 -4  9 -5 10  0  0  0  0  0
CONSEQ102 14  1 -1 -2  2 -3  3  4  5  6 -4  7 -5  8  9  0  0  0  0  0  0
CONWAT101  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
CONWAT102  0101  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
CONEND  5 67  4 75  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0


                    ***  LISTING OF INPUT DATA  ***

JREAD =    2
AQUFER 0 101    FLOOD PLAIN ALLUVIAL AQUFER FOR NODE 1
GRTANK 02101    602412. 170.0  31.0 101.0 158.0 525.0 283.0    2.0   0.7    0.0 5067
          602412.00       263.77        31.00        101.00        158.00        525.00        283.00        2.00        0.70      1222.97
AQUFER 0 102    FLOOD PLAIN ALLUVIAL AQUFER FOR NODE 2
GRTANK 02102    106376. 135.0  33.0 359.0 282.0 705.0 423.0    4.0   0.9    0.0 5167
          106376.00       229.12        33.00        359.00        282.00        705.00        423.00        4.00        0.90      1823.52
COLREG 8 101
COLSEG101  1    10.0    2.7   11.4    3.0    9.8   11.0    0.0    0.6 .71 10.05 20.00  0.40 * 1.42  20.0
COLSEG101  2    10.4    3.0   13.1    2.8   12.7   10.4    0.0    0.8 .73 10.09 20.00  0.40 * 1.38  20.0
COLSEG101  3    20.7    6.3   20.2    3.7   33.6    9.0    0.0    0.6 .78 10.06 20.00  0.40 * 1.29  20.0
COLSEG101  4    32.0   10.3   30.2    6.2   56.8    9.1    0.0    1.2 .70 10.72 20.00  0.40 * 1.54  20.0
COLSEG101  5    32.6   11.4   38.4   10.9   59.9    8.0    0.0    3.0 .38  5.78  5.00  0.20 * 1.52  20.0
COLSEG101  6    22.9    7.1   27.6    9.0   38.9    7.4    0.0    1.8 .35  5.20  5.00  0.20 * 1.49  20.0
COLSEG101  7    17.6    5.5   22.3    7.5   29.4    6.9    0.0    1.1 .34  5.41  5.00  0.20 * 1.61  20.0
COLSEG101  8    15.0    4.6   20.3    6.4   26.1    6.7    0.0    0.9 .31  4.93  5.00  0.20 * 1.61  20.0
COLREG 8 102
COLSEG102  1    10.0    2.7   11.4    3.0    9.8   11.0    0.0    0.6 .71 10.05 20.00  0.40 * 1.42  20.0
COLSEG102  2    10.4    3.0   13.1    2.8   12.7   10.4    0.0    0.8 .73 10.09 20.00  0.40 * 1.38  20.0
COLSEG102  3    20.7    6.3   20.2    3.7   33.6    9.0    0.0    0.6 .78 10.06 20.00  0.40 * 1.29  20.0
COLSEG102  4    32.0   10.3   30.2    6.2   56.8    9.1    0.0    1.2 .70 10.72 20.00  0.40 * 1.54  20.0
COLSEG102  5    32.6   11.4   38.4   10.9   59.9    8.0    0.0    3.0 .38  5.78  5.00  0.20 * 1.52  20.0
COLSEG102  6    22.9    7.1   27.6    9.0   38.9    7.4    0.0    1.8 .35  5.20  5.00  0.20 * 1.49  20.0
COLSEG102  7    17.6    5.5   22.3    7.5   29.4    6.9    0.0    1.1 .34  5.41  5.00  0.20 * 1.61  20.0
COLSEG102  8    15.0    4.6   20.3    6.4   26.1    6.7    0.0    0.9 .31  4.93  5.00  0.20 * 1.61  20.0
COLEND 8    3


                    ***  LISTING OF INPUT DATA  ***

JREAD =    4
SURDIN 1 101    RIO GRANDE AT HEAD OF SYSTEM                                       1 6
QINFLO 12101SUR 42150.  74.0  15.0  92.0  71.0 200.0  90.0   0.0   0.0 517.0 5067
          42150.00         74.00        15.00        92.00        71.00       261.70        90.00        0.0        0.0       558.70
SURDEM 1 101    RIVER FLOW AFTER DIV. PLUS FL PAST CAR.                            1 6
DEMSUP 11101MAT  5990.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 5067
CONUSE101 1        0. 0.50.SUR101 3100SUR101 3100SUR101 3100                        5 67
SURDEM 2 101    PUMPAGE FROM G.W. TO SUPPLY DEMAND                                  1 6
DEMGWR 21101SUR     0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 5067
CONUSE101 2        0. 0.50.SUR101 2100SUR101 2100SUR101 2100                        5 67
SURDIN 2 101    IRR. DEMAND SUPPLIED FROM G.W.                                      1 6
QINFLO 22101SUR     0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 1067
SURDEM 3 101    IRRIGATION DEMAND                                                   1 6
DEMSUP 31101IRR  5133.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 5067
CONUSE101 3     7301. 0.50.GWV101 8100GWV101 8100GWV101 8100                        5 67
```

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```
                 ***  LISTING OF INPUT DATA  ***

JREAD =    5
QINFLO 12101SUR 47930.  72.0  15.0  88.0  68.0 192.0  89.0   0.0   0.0 499.0 6067
          47930.00         72.00         15.00         88.00        68.00        253.41      89.00        0.0        0.0      540.91
DEMSUR 11101MAT  6969.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 6067
CONUSE101 1         0. 0.50.SUR101 3100SUR101 3100SUR101 3100                   6 67
DEMGWR 21101SUR  5205.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 6067
CONUSE101 2         0. 0.50.SUR101 2100SUR101 2100SUR101 2100                   6 67
DEMSUR 31101IRR 18615.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 6067
CONUSE101 3     10622. 0.50.GWV101 8100GWV101 8100GWV101 8100                   6 67

                *** CALCULATED INPUT DATA ***

               IRRIGATION DEMAND =   36114.8
               CONSUMPTIVE USE =  18057.4    BOTH CALCULATED WITH IRR. EFF. = 0.50
                                                AND ET*FACTOR = NEW ET, WITH FACTOR =  1.700

               OLD IRRIGATION DEMAND =  36114.8
               OLD IRRIGATION EFF. =  0.50
               DEMAND DIFF. (WATER SAVINGS) =        0.0

QINFLO 52101CHK  6364.  72.0  15.0  88.0  68.0 192.0  89.0   0.0   0.0 499.0 6067
          6364.00          72.00         15.00         88.00        68.00        253.41      89.00        0.0        0.0      540.91
QINFLO 62101CHK  1664. 119.0  10.0 153.0 156.0 321.0 102.0   0.0   0.0 889.7 6067
          1664.00         266.84         31.80        110.23       159.86        553.16     280.56        1.95       2.10     1266.22
QINFLO 72101CHK     0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 6067
DEMSUR 11102MAT 13404.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 6067
CONUSE102 1         0. 0.50.SUR102 3100SUR102 3100SUR102 3100                   6 67
DEMGWR 21102SUR  2472.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 6067
CONUSE102 2         0. 0.50.SUR102 2100SUR102 2100SUR102 2100                   6 67
DEMSUR 31102IRR 31025.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 6067
CONUSE102 3     17625. 0.50.GWV102 6100GWV102 6100GWV102 6100                   6 67

                *** CALCULATED INPUT DATA ***

               IRRIGATION DEMAND =   59925.0
               CONSUMPTIVE USE =  29962.5    BOTH CALCULATED WITH IRR. EFF. = 0.50
                                                AND ET*FACTOR = NEW ET, WITH FACTOR =  1.700

               OLD IRRIGATION DEMAND =  59925.0
               OLD IRRIGATION EFF. =  0.50
               DEMAND DIFF. (WATER SAVINGS) =        0.0

QINFLO 52102CHK 25298.  90.0  18.0 144.0 113.0 258.0 232.0   0.0   1.9 805.0 6067
          25298.00         73.20         18.00        144.00       113.00        258.00     232.00        0.0        1.90      744.10
ENDATA 00  0            0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 00 0



          18057.38      447.44      73.69      543.12      264.91      1923.86      206.19      0.0      67.94      3424.06
          29962.48      447.44      73.69      543.12      264.91      1923.86      206.19      0.0      67.94      3424.05
```

```
           *** CALCULATED INPUT DATA ***

        IRRIGATION DEMAND =  24823.4
        CONSUMPTIVE USE =  12411.7   BOTH CALCULATED WITH IRR. EFF. = 0.50
                                          AND ET*FACTOR = NEW ET, WITH FACTOR =  1.700


        OLD IRRIGATION DEMAND =  24823.4
        OLD IRRIGATION EFF. =  0.50
        DEMAND DIFF. (WATER SAVINGS) =       0.0
SUPQIN 3 101    RIO GRANDE FLOW ABOVE MESILLA DAM
QINFLO 30101SUP     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
                                                                                1 6
SUPQIN 4 101    EXCESS RIVER DIVERSION
QINFLO 42101SUP     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
                                                                                1 6
SUPQIN 5 101    EL PASO CARRIAGE AND WASTE-OBS. OUTFLOWS
QINFLO 52101CHK  6934.  74.0  15.0  92.0  71.0  200.0   90.0    0.0    0.0  517.0 5067
           6934.00      74.00       15.00         92.00          71.00        261.70        90.00        0.0        .0.0        558.70
SUPQIN 6 101    DEL RIO DRAIN - OBSERVED OUTFLOW                                  897 1 6
QINFLO 62101CHK  1771. 125.0  11.0 161.0 164.0  337.0  108.0    0.0    0.0  933.9 5067
           1771.00     263.77       31.00        101.00         158.00        525.00       283.00        2.00        0.70       1222.97
SUPQIN 7 101    RIO GRANDE OUTFLOW AT MESILLA DAM                                   106
QINFLO 72101CHK     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 5067
SUPQIN 8 101    IRRIGATION RETURN FLOW                                              106
QINFLO 80101GWR     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
SUPDEM 4 101    TRANSFER OF FLOW FROM RIVER TO AQUIFER                              106
DEMSUP 41101GWR-    0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
CONUSE101 4       0. 0.50.GWR101 9100      0 0  0       0 0  0                    1 67
SUPQIN 9 101    INFLOW TO AQUIFER FROM RIVER                                        106
QINFLO 90101GWR     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
SUPDEM 5 101    TRANS. OF FLOW FROM AQ. TO DEL RIO DRAIN                            106
DEMGWR 51101SUP     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
CONUSE101 5       0. 0.50.SUP10110100      0 0  0       0 0  0                    1 67
SUPQIN10 101    INFLOW TO DEL RIO DRAIN FROM AQUIFER                                106
QINFLO100101SUP     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
SUPQIN 1 102    RIO GRANDE AT MESILLA DAM-HEAD OF NODE 2                            106
QINFLO 10102SUP     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
SUPDEM 1 102    RIVER FLOW AFTER DIVERSION                                          106
DEMSUP 11102 AI 13474.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 5067
CONUSE102 1       0. 0.50.SUP102 3100SUP102 3100SUP102 3100                       5 67
SUPDEM 2 102    PUMPAGE FROM G.W. TO SUPPLY DEMAND                                  106
DEMGWR 21102SUP     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 5067
CONUSE102 2       0. 0.50.SUP102 2100SUP102 2100SUP102 2100                       5 67
SUPQIN 3 102    IRR. DEMAND SUPPLIED FROM G.W.                                      106
QINFLO 32102SUP     0.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 1067
SUPDEM 3 102    IRRIGATION DEMAND                                                   106
DEMSUP 31102IRR  8555.   0.0   0.0   0.0   0.0    0.0    0.0    0.0    0.0    0.0 5067
CONUSE102 3   12114. 0.50.GWV102 6100GWV102 6100GWV102 6100                       5 67
```

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```
                    *** CALCULATED INPUT DATA ***

              IRRIGATION DEMAND =  41187.6
              CONSUMPTIVE USE =  20593.8   BOTH CALCULATED WITH IRR. EFF. = 0.50
                                             AND ET*FACTOR = NEW ET. WITH FACTOR =  1.700

              OLD IRRIGATION DEMAND =  41187.6
              OLD IRRIGATION EFF. =  0.50
              DEMAND DIFF. (WATER SAVINGS) =      0.0
SUBQIN 3 102   RIO GRANDE FLOW BELOW MESILLA DAM
QINFLO 30102SUB      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 106
SUBQIN 4 102   EXCESS RIVER DIVERSION                                            1067
QINFLO 40102SUB      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 5 6
SUBQIN 5 102   RIO GRANDE OUTFLOW AT COURCHESNE BRIDGE                           1067
QINFLO 52102CHK 24209.  91.0  18.0 154.0 121.0 280.0 204.0  12.0   0.6 831.0 106
            24209.00        96.58        18.00        154.00        121.00     5067
SUBQIN 6 102   IRRIGATION RETURN FLOW                                     280.00       204.00       12.00       0.60       784.18
QINFLO 62102GWR      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 106
SUBDEM 4 102   TRANSFER OF FLOW FROM RIVER TO AQUIFER                            1067
DEMSUR 41102GWR      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 106
CONUSE102 4        0. 0.50 GWF102 7100       0  0  0        0  0  0             1067
SUBQIN 7 102   INFLOW TO AQUIFER FROM RIVER                                      1 67
QINFLO 70102GWR      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 106
SUBDEM 5 102   TRANSFER OF FLOW FROM AQUIFER TO RIVER                            1067
DEMGWR 51102SUB      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 106
CONUSE102 5        0. 0.50 SUB102 8100SUB102 9100SUB101 1100                     1067
SUBQIN 8 102   INFLOW TO RIVER FROM AQUIFER                                      1 67
QINFLO 80102SUB      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 106
SUBQIN 9 102   INTERNODAL TRANS FROM UPSTREAM AQUIFER                            1067
QINFLO 90102SUB      0.   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 106
ENDATA 0   0                                                                     1067
```

OPERATIONAL NOTES:

(1) To eliminate the soil column simulations, change each monthly "CONUSE101 3" and "CONUSE102 3" card as follows: replace the letters "GWV" with "GWR".

(2) To change the ET multiplier or irrigation efficiency, see the Subroutine Peruse, Appendix B, the three lines below line # HYD03950.

(3) To change the water delivery system efficiency, see the main program, Appendix B, one line below line # HYD00640.

(4) Note that the listing of input data for all monthly inputs following the first month is abbreviated.

```
   12411.68        450.33         72.49        544.64        265.35       1928.16        206.58          0.0          68.35        3432.20
   20593.79        450.33         72.49        544.64        265.35       1928.16        206.58          0.0          68.35        3432.20
```

```
RESEARCH IN CONJUNCTIVE USE STUDY FOR THE MESILLA PROJECT          NUMBER OF NODES = 2      PAGE NO.  1
NODE NUMBER = 101     MONTH OF MAY          YEAR 1967
                                                      VOLUME     CA     MG     NA     CL    SO4   HCO3    CO3    NO3   TOTAL   SALTS
                                                    ACRE FEET   PPM    PPM    PPM    PPM    PPM    PPM    PPM    PPM    PPM   TONS/AF
OPERATIONAL SEQUENCE OF SURFACE FACILITIES

    RIO GRANDE AT HEAD OF SYSTEM                      42150     73     14     92     70    261     89      0      0    558    0.760
    RIVER FLOW AFTER DIV. PLUS EL PASO CAR.           36160     73     14     92     70    261     89      0      0    558    0.760
    PUMPAGE FROM G.W. TO SUPPLY DEMAND                21528    263     30    100    157    524    282      1      0   1222    1.663
    IRR. DEMAND SUPPLIED FROM G.W.                    21528    263     30    100    157    524    282      1      0   1222    1.663
    IRRIGATION DEMAND                                 24823    238     28     99    146    490    257      1      0   1134    1.543
    SHORTAGE FROM THE IDEAL DEMAND                        0
    RIO GRANDE FLOW ABOVE MESILLA DAM                 36160     73     14     92     70    261     89      0      0    558    0.760
    EXCESS RIVER DIVERSION                                0      0      0      0      0      0      0      0      0      0    0.0
OBSERVED OUTFLOWS FROM NODE

    EL PASO CARRIAGE AND WASTE-OBS. OUTFLOWS           6934     73     14     92     70    261     89      0      0    558    0.760
    DEL RIO DRAIN - OBSERVED OUTFLOW                   1771    263     30    100    157    524    282      1      0   1222    1.663
    RIO GRANDE OUTFLOW AT MESILLA DAM                 29226     73     14     92     70    261     89      0      0    558    0.760
SUBSURFACE OPERATIONS AND FLOW TRANSFERS

    AQUIFER CONDITIONS OF LAST TIME FRAME            602412    263     30    100    157    524    282      1      0   1222    1.663
    IRRIGATION RETURN FLOW                            12411    477     57    199    292    980    514      3      1   2269    3.397
    TRANSFER OF FLOW FROM RIVER TO AQUIFER                0      0      0      0      0      0      0      0      0      0    0.0
    INFLOW TO AQUIFER FROM RIVER                          0      0      0      0      0      0      0      0      0      0    0.0
    TRANS. OF FLOW FROM AQ. TO DEL RIO DRAIN           1771    263     30    100    157    524    282      1      0   1222    1.663
    INFLOW TO DEL RIO DRAIN FROM AQUIFER               1771    263     30    100    157    524    282      1      0   1222    1.663

COMPARISON INDEX

    TOTAL OBSERVED OUTFLOWS FROM NODE                 37931     82     15     92     75    273     99      0      0    589    0.802
    TOTAL PREDICTED OUTFLOWS FROM NODE                37931     82     15     92     75    273     99      0      0    589    0.802
    SIMPLE DIFFERENCE (OBSERVED-PREDICTED)                0      0      0      0      0      0      0      0      0      0    0.000
CHEMICAL CHANGES IN NODE

    OBSERVED CHANGE                                       0      8      0      0      4     12      9      0      0     31    0.042
    PREDICTED CHANGE                                      0      8      0      0      4     12      9      0      0     31    0.042
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RESEARCH IN CONJUNCTIVE USE STUDY FOR THE MESILLA PROJECT            NUMBER OF NODES = 2      PAGE NO.  2
NODE NUMBER = 102      MONTH OF MAY          YEAR 1967

                                                   VOLUME     CA     MG     NA     CL     SO4    HCO3    CO3    NO3    TOTAL   SALTS
OPERATIONAL SEQUENCE OF SURFACE FACILITIES       ACRE FEET    PPM    PPM    PPM    PPM    PPM     PPM    PPM    PPM     PPM   TONS/AF

   RIO GRANDE AT MESILLA DAM-HEAD OF NODE 2         37931     82     15     92     75    273      99      0      0     589    0.802
   RIVER FLOW AFTER DIVERSION                       24457     82     15     92     75    273      99      0      0     589    0.802
   PUMPAGE FROM G.W. TO SUPPLY DEMAND               33776    229     32    357    281    704     422      3      0    1923    2.490
   IRR. DEMAND SUPPLIED FROM G.W.                   33776    229     32    357    281    704     422      3      0    1923    2.480
   IRRIGATION DEMAND                                41187    202     29    310    244    627     364      3      0    1601    2.176
   SHORTAGE FROM THE IDEAL DEMAND                       0
   RIO GRANDE FLOW BELOW MESILLA DAM                24457     82     15     92     75    273      99      0      0     589    0.802
   EXCESS RIVER DIVERSION                               0      0      0      0      0      0       0      0      0       0    0.0
OBSERVED OUTFLOWS FROM NODE

   RIO GRANDE OUTFLOW AT COURCHESNE BRIDGE          24209     96     17    153    120    279     203     11      0     784    1.066
SUBSURFACE OPERATIONS AND FLOW TRANSFERS

   AQUIFER CONDITIONS OF LAST TIME FRAME          1063760    229     32    357    281    704     422      3      0    1823    2.480
   IRRIGATION RETURN FLOW                           20593    405     59    620    499   1254     729      6      1    3203    4.356
   TRANSFER OF FLOW FROM RIVER TO AQUIFER             248     82     15     92     75    273      99      0      0     589    0.802
   INFLOW TO AQUIFER FROM RIVER                       248     82     15     92     75    273      99      0      0     589    0.802
   TRANSFER OF FLOW FROM AQUIFER TO RIVER               0      0      0      0      0      0       0      0      0       0    0.0
   INFLOW TO RIVER FROM AQUIFER                         0      0      0      0      0      0       0      0      0       0    0.0
   INTERNODAL TRANS FROM UPSTREAM AQUIFER               0      0      0      0      0      0       0      0      0       0    0.0

COMPARISON INDEX

   TOTAL OBSERVED OUTFLOWS FROM NODE                24209     96     17    153    120    279     203     11      0     784    1.066
   TOTAL PREDICTED OUTFLOWS FROM NODE               24209     82     15     92     75    273      99      0      0     589    0.802
   SIMPLE DIFFERENCE (OBSERVED-PREDICTED)               0     13      2     61     45      6     104     11      0     194    0.264
CHEMICAL CHANGES IN NODE

   OBSERVED CHANGE                                      0     13      2     61     45      6     104     11      0     194    0.264
   PREDICTED CHANGE                                     0      0      0      0      0      0       0      0      0       0   -0.000
CHEMICAL CHANGES IN SYSTEM

   OBSERVED CHANGE                                      0     22      2     61     50     18     114     11      0     225    0.307
   PREDICTED CHANGE                                     0      8      0      0      4     12       9      0      0      31    0.042
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RESEARCH IN CONJUNCTIVE USE STUDY FOR THE MESILLA PROJECT        NUMBER OF NODES = 2      PAGE NO.  3
NODE NUMBER = 131      MONTH OF JUN           YEAR 1967
                                              VOLUME     CA    MG    NA    CL    SO4   HCO3  CO3   NO3   TOTAL  SALTS
                                            ACRE FEET   PPM   PPM   PPM   PPM   PPM   PPM   PPM   PPM   PPM   TONS/AF

OPERATIONAL SEQUENCE OF SURFACE FACILITIES

   RIO GRANDE AT HEAD OF SYSTEM                 47930    71    14    87    67   253    88     0     0    540  0.736
   RIVER FLOW AFTER DIV. PLUS EL PASO CAR.      40961    71    14    87    67   253    88     0     0    540  0.736
   PUMPAGE FROM G.W. TO SUPPLY DEMAND           32291   266    31   110   159   553   280     1     2   1266  1.722
   IRR. DEMAND SUPPLIED FROM G.W.               32281   266    31   110   159   553   280     1     2   1266  1.722
   IRRIGATION DEMAND                            36114   246    30   107   150   521   260     1     1   1189  1.617
   SHORTAGE FROM THE IDEAL DEMAND                   0
   RIO GRANDE FLOW ABOVE MESILLA DAM            40961    71    14    87    67   253    88     0     0    540  0.736
   EXCESS RIVER DIVERSION                           0     0     0     0     0     0     0     0     0      0  0.0

OBSERVED OUTFLOWS FROM NODE

   EL PASO CARRIAGE AND WASTE-CRS. OUTFLOWS      6364    71    14    87    67   253    88     0     0    540  0.736
   DEL RIO DRAIN - OBSERVED OUTFLOW              1664   266    31   110   159   553   280     1     2   1266  1.722
   RIO GRANDE OUTFLOW AT MESILLA DAM            34597    71    14    87    67   253    88     0     0    540  0.736

SUBSURFACE OPERATIONS AND FLOW TRANSFERS

   AQUIFER CONDITIONS OF LAST TIME FRAME       594219   266    31   110   159   553   280     1     2   1266  1.722
   IRRIGATION RETURN FLOW                       18057   492    60   215   300  1042   520     3     3   2378  3.235
   TRANSFER OF FLOW FROM RIVER TO AQUIFER           0     0     0     0     0     0     0     0     0      0  0.0
   INFLOW TO AQUIFER FROM RIVER                     0     0     0     0     0     0     0     0     0      0  0.0
   TRANS. OF FLOW FROM AQ. TO DEL RIO DRAIN      1664   266    31   110   159   553   280     1     2   1266  1.722
   INFLOW TO DEL RIO DRAIN FROM AQUIFER          1664   266    31   110   159   553   280     1     2   1266  1.722

COMPARISON INDEX

   TOTAL OBSERVED OUTFLOWS FROM NODE            42625    79    15    88    71   265    96     0     0    569  0.774
   TOTAL PREDICTED OUTFLOWS FROM NODE           42625    79    15    88    71   265    96     0     0    569  0.774
   SIMPLE DIFFERENCE (OBSERVED-PREDICTED)           0     0     0     0     0     0     0     0     0      0  0.000

CHEMICAL CHANGES IN NODE

   OBSERVED CHANGE                                  0     7     0     0     3    11     7     0     0     28  0.039
   PREDICTED CHANGE                                 0     7     0     0     3    11     7     0     0     28  0.039
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RESEARCH IN CONJUNCTIVE USE STUDY FOR THE MESILLA PROJECT         NUMBER OF NODES = 2      PAGE NO.  4

NODE NUMBER = 102     MONTH OF JUN         YEAR 1967

                                                  VOLUME     CA      MG      NA      CL      SO4    HCO3     CO3     NO3    TOTAL   SALTS
                                                ACRE FEET   PPM     PPM     PPM     PPM     PPM     PPM     PPM     PPM    PPM     TONS/AF
OPERATIONAL SEQUENCE OF SURFACE FACILITIES

   RIO GRANDE AT MESILLA DAM-HEAD OF NODE 2        42625     79      15      88      71     265      96       0       0     569    0.774
   RIVER FLOW AFTER DIVERSION                      29221     79      15      88      71     265      96       0       0     569    0.774
   PUMPAGE FROM G.W. TO SUPPLY DEMAND              52552    232      33     360     280     726     416       3       2    1847    2.513
   IRR. DEMAND SUPPLIED FROM G.W.                  52552    232      33     360     280     726     416       3       2    1847    2.513
   IRRIGATION DEMAND                               59924    213      31     326     254     669     377       3       1    1690    2.299
   SHORTAGE FROM THE IDEAL DEMAND                      0
   RIO GRANDE FLOW BELOW MESILLA DAM               29221     79      15      88      71     265      96       0       0     569    0.774
   EXCESS RIVER DIVERSION                              0      0       0       0       0       0       0       0       0       0    0.0

OBSERVED OUTFLOWS FROM NODE

   RIO GRANDE OUTFLOW AT COURCHESNE BRIDGE         25298     93      17     143     112     257     231       0       1     744    1.012

SUBSURFACE OPERATIONS AND FLOW TRANSFERS

   AQUIFER CONDITIONS OF LAST TIME FRAME         1356887    232      33     363     280     726     416       3       2    1947    2.513
   IRRIGATION RETURN FLOW                          29962    427      62     653     509    1339     754       6       3    3380    4.598
   TRANSFER OF FLOW FROM RIVER TO AQUIFER           3923     79      15      88      71     265      96       0       0     569    0.774
   INFLOW TO AQUIFER FROM RIVER                     3923     79      15      88      71     265      96       0       0     569    0.774
   TRANSFER OF FLOW FROM AQUIFER TO RIVER              0      0       0       0       0       0       0       0       0       0    0.0
   INFLOW TO RIVER FROM AQUIFER                        0      0       0       0       0       0       0       0       0       0    0.0
   INTERNODAL TRANS FROM UPSTREAM AQUIFER              0      0       0       0       0       0       0       0       0       0    0.0

COMPARISON INDEX

   TOTAL OBSERVED OUTFLOWS FROM NODE               25298     93      17     143     112     257     231       0       1     744    1.012
   TOTAL PREDICTED OUTFLOWS FROM NODE              25299     79      15      88      71     265      96       0       0     569    0.774
   SIMPLE DIFFERENCE (OBSERVED-PREDICTED)              0     13       2      55      41      -7     135       0       1     174    0.238

CHEMICAL CHANGES IN NODE

   OBSERVED CHANGE                                     0     13       2      55      41      -7     135       0       1     174    0.238
   PREDICTED CHANGE                                    0      0       0       0       0       0       0       0       0       0   -0.000

CHEMICAL CHANGES IN SYSTEM

   OBSERVED CHANGE                                     0     21       2      56      44       4     143       0       1     203    0.276
   PREDICTED CHANGE                                    0      7       0       0       3      11       7       0       0      28    0.039
```

APPENDIX D

D. ESTIMATION OF MISSING WATER QUALITY DATA AT LEASBURG

In order to run the USBR-EPA hydrosalinity model and simulate chemical interaction effects in the unsaturated zone above the water table for the ten-year period (1967-1976), complete chemical analyses of the river water at Leasburg is required, since this is the input point at the head of the nodal system of the model. Montly TDS values, however, are the only available water quality data for much of this period (see Appendix A). There are some other available records of river flow at Leasburg with complete chemical analyses for earlier years (Hernandez, 1976, Appendix B). Regression methods were applied to this earlier data in order to establish relationships between the major individual ion species present (Ca^{++}, Mg^{++}, Na^{+}, Cl^{-}, $So_4^{=}$, HCO_3^{-}, $CO_2^{=}$, and NO_3^{-}) and the mean monthly river flow. Once these regression relationships were established, the concentration of major individual ion species could be estimated for the missing data in the ten-year simulation period.

The monthly records for two periods, 1940-1944 and 1959-1963, were used in establishing these regression relationships (see Hernandez, 1976, Appendix B). For the period 1940-1944, the logarithm of the mean monthly discharge (CFS) was compared against the logarithm of the respective ions (meq/l) mentioned above. For the period 1959-1963, the logarithm of mean monthly discharge (CFS) was compared against the individual ion fraction, which is defined as

$$\text{ion fraction} = \frac{\text{individual ion species (ppm)}}{\text{total dissolved solids (ppm)}}$$

The latter method of comparison gave very low correlation coefficients, whereas the former method gave relatively higher ones. Therefore the regression relationships obtained from the first method, based on the 1940-1944 period, were used to estimate the concentration of major ion species for the missing data in the ten-year simulation period. These relationships are listed in Table D-1. After estimating these ions, a cation-anion balance was made in order to calculate a TDS value, since this procedure is automatically performed in the USBR-EPA model. The model utilizes this calculated TDS based on the ion balance in all subsequent internal simulations. In calculating this TDS value, the USBR-EPA model will add any cation-anion deficit to either the calcium or sulfate concentration, depending on whether the deficiency is from the cations or anions, respectively. When this procedure was used to calculate TDS values for the simulated input data, large discrepancies between these and observed values often existed. In several cases this calculated TDS value was almost twice the observed TDS value. To remedy this situation so that the model utilized the observed TDS data, the estimated individual ion values for the major ions present were further modified. The iteration procedure used is explained below in a sample calculation. Results are shown in Table D-2.

TABLE D-1. REGRESSION RELATIONSHIPS FOR ESTIMATING THE MISSING WATER QUALITY DATA AT LEASBURG, OBTAINED FROM THE DATA LISTED IN HERNANDEZ (1976)

Ion species	Regression relationship			Correlation coefficient
	(1)		(2)	
Calcium	$\log(\mathrm{Ca})$	=	$-0.195 \log(Q) + 2.428$	-0.868
Magnesium	$\log(\mathrm{Mg})$	=	$-0.196 \log(Q) + 1.757$	-0.924
Sodium	$\log(\mathrm{Na})$	=	$-0.222 \log(Q) + 2.594$	-0.957
Bicarbonate	$\log(\mathrm{HCO_3})$	=	$-0.061 \log(Q) + 2.110$	-0.429
Sulfate	$\log(\mathrm{SO_4})$	=	$-0.252 \log(Q) + 3.017$	-0.956
Chloride	$\log(\mathrm{Cl})$	=	$-0.284 \log(Q) + 2.658$	-0.944
Nitrate (3)	$\log(\mathrm{NO_3})$	=	$+0.033 \log(Q) - 0.090$	+0.110

(1) Estimated ion concentration (meq/ℓ) in the Rio Grande at Leasburg.

(2) Observed river flow (CFS) above Leasburg Dam.

(3) Not used in subsequent calculations. The nitrate concentration in the Rio Grande was assumed to be zero for the missing data period shown in Appendix A.

TABLE D-2. RESULTS OBTAINED FOR NOVEMBER, 1972, USING THE ITERATION PROCEDURE TO BALANCE CATIONS AND ANIONS SO THAT THE CALCULATED TDS OBTAINED EQUALS THE OBSERVED TDS

	Ion(i)	ω_i	X_i^0(ppm)	X_i^1(ppm)	Y_i^1(meq/ℓ)	X_i^2(ppm)	Y_i^2(meq/ℓ)
1.	Ca^{++}	20.04	162	119.1	5.94	114.3	5.70
2.	Mg^{++}	12.16	34	25.0	2.06	24.0	1.97
3.	Na^{+}	23.00	222	163.2	7.10	156.7	6.81
4.	Cl^{-}	35.46	219	161.0	4.54	154.5	4.36
5.	$SO_4^{=}$	48.03	544	399.9	8.33	420.5	8.76
6.	*HCO_3^{-}	61.01	119	87.5	1.43	84.0	1.38
7.	$CO_3^{=}$	30.00	0	0	0	0	0
8.	NO_3^{-}	62.01	0	0	0	0	0
			$\sigma^0 = 1240.5$	$\sigma^1 = 950.6$	BAL = 0.80	$\sigma^2 = 912.1$	BAL = -0.02
			$\sigma_{OBS} = 912$				

*Only one-half of the reported bicarbonate concentration is used in calculating total dissolved solids (σ).

The water quality data that is missing (July,1968 to December,1975) and estimated by the procedure described here, is listed in Appendix A, along with all of the observed data required to operate the USBR-EPA model.

Description of Iteration Procedure

Complete chemical analyses of major ions for surface waters are observed at Leasburg for only a portion of the ten-year simulation period (1967-1976), whereas the TDS is observed for the entire period. The detailed chemical analyses cover the periods of May,1967 to June,1968, and from January,1976 to December,1976. The missing chemical analyses of major ions in the ten-year interval (i.e., July,1968 to December,1975) were estimated, based on the regression method described above, and the iteration procedure described here. Once the individual ion concentrations (for Ca^{++}, Mg^{++}, Na^+, Cl^-, $SO_4^=$, HCO_3^-, $CO_2^=$, and NO_3^-) were obtained from the regression coefficients and observed river flow at Leasburg, they were further modified by an iteration procedure. This was done so that the calculated TDS equaled the observed TDS.

This iteration procedure is best described by a series of calculations listed below. The results obtained for November,1972 are shown in Table D-2. The symbols appearing in the table are defined as:

ω_i - ion equivalent weight, which is equal to the ion atomic weight divided by its valence.

X_i^0 - concentration (ppm) of the respective ion (i), obtained from the regression relationship.

X_i^j - the corrected concentration (ppm), as described in the iteration procedure below; j refers to the iteration number.

Y_i^j - the concentration of X_i^j, in meq/ℓ.

The steps in the iteration procedure are:

(1) compute the ratio of observed to calculated TDS, i.e.

$$\text{RATIO} = \frac{\sigma_{OBS}}{\sigma^0} = \frac{912}{1240.5} = 0.735$$

(2) Multiply X_i^0 by the ratio obtained in (1) above, to obtain X_i^1, as shown in column 4, Table D-2.

(3) Compute Y_i^1 from X_i^1, i.e.

$$Y_i^j = X_i^j/\omega_i$$

(4) Calculate the cation-anion balance using the values Y_i^1, obtained from step (3) above, i.e.

$$\text{sum of cations} = Y_1^{\,1} + Y_2^{\,1} + Y_3^{\,1} = 5.94 + 2.06 + 7.10$$

$$\Sigma\ \text{Cat.} = 15.10\ \text{meq}/\ell$$

$$\text{sum of anions} = Y_4^{\,1} + Y_5^{\,1} + Y_6^{\,1} + Y_7^{\,1} + Y_8^{\,1}$$

$$\Sigma\ \text{Ani.} = 4.54 + 8.33 + 1.43 = 14.30\ \text{meq}/\ell$$

$$\text{BAL} = \Sigma\ \text{Cat.} - \Sigma\ \text{Ani.} = 15.10 - 14.30$$

$$\text{BAL} = 0.80\ \text{meq}/\ell$$

(5) Since the balance (BAL) in step (4) is greater than zero, there are more cations than anions; an anion deficit exists. The sulfate ($SO_4^{=}$) ion concentration is therefore corrected using the expression

$$X_5^{\,1} = \omega_5 \cdot \sum_{i=1}^{n} Y_i^{\,1} \quad , \quad \text{letting } Y_5^{\,1} = 0.0$$

Here ω_5 is the equivalent weight for sulfate and n is the total number of individual ions (8). The summation is done for the ion concentration in meq/ℓ (column 5 of Table D-2). Thus,

$$X_5^{\,1} = 48.03\ (5.94 + 2.06 + 7.10 - 4.54 - 0.0 - 1.43)$$

$$X_5^{\,1} = 438.5\ \text{ppm}$$

The corrected sulfate concentration in column 4 should now be 438.5 ppm, and not 399.9 ppm as listed.

If a cation deficit were calculated (i.e., BAL less than zero), the calcium (Ca^{++}) concentration would be corrected using a similar relation, or

$$X_1^{\,1} + \omega_1 \cdot \sum_{i=1}^{n} Y_i^{\,1} \quad , \quad \text{letting } Y_1^{\,1} = 0.0$$

Now ω_1 would be the equivalent weight for calcium.

(6) A new TDS is obtained using the sulfate concentration from step (5) above (or the calcium concentration if a cation deficit were found), and the remaining data from column 4. Thus,

$$\sigma^1 = \sum_{i=1}^{n} X_i^{\,1} = 119.1 + 25.0 + 163.2 + 161.0 + 438.5 + 0.5(87.5)$$

$$\sigma^1 = 950.6\ \text{ppm}$$

Note that only one-half of the bicarbonate concentration is used to calculate the TDS.

(7) A new ratio can now be found; the iteration procedure is repeated.

$$\text{RATIO} = \frac{\sigma_{OBS}}{\sigma^1} = \frac{912}{950.6} = 0.959$$

(8) Multiplying X_i^1 by the new ratio found in step (7) to obtain X_i^2 (column 6, Table D-2). Remember that the sulfate concentration was modified in step (4) above.

(9) Repeat steps (3) through (6) to obtain a new BAL. If the BAL is within one percent of the cation sum, the procedure is terminated. Otherwise continue with steps (7) through (9).

APPENDIX E

E. CONVERSION TABLE FOR ENGLISH TO SI UNITS

TABLE E-1. ENGLISH-METRIC CONVERSION TABLE

1.0 inch	25.4 millimeters
1.0 inch	2.54 centimeters
1.0 foot	30.48 centimeters
1.0 foot	0.3048 meters
1.0 acre	4047 square meters
1.0 acre	0.4047 hectares
1.0 gallon	3.7854 liters
1.0 gallon	0.0037854 cubic meters
1.0 cubic foot	28.32 liters
1.0 cubic foot	0.02832 cubic meters
1.0 acre-foot	1,233,000 liters
1.0 acre-foot	1233 cubic meters
1.0 gallon per minute	3.7854 liters per minute
1.0 gallon per minute	0.06309 liters per second
1.0 gallon per minute	0.0037854 cubic meters per minute
1.0 gallon per minute	63.09 x 10^{-6} cubic meters per minute
1.0 cubic foot per second	28.32 liters per second
1.0 cubic foot per second	0.02832 cubic meters per second